

Development of a Learning Model to Assess Service Quality and Airport Passenger Satisfaction at Aviation Polytechnic

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DOI : <https://doi.org/10.46245/ijorer.v6i4.943>

Sections Info

Article history:

Submitted: Juni 19, 2025

Final Revised: July 07, 2025

Accepted: July 09, 2025

Published: July 10, 2025

Keywords:

Teaching model; Service quality; Passenger satisfaction; Aviation education; R&D



ABSTRACT

Objective: To develop a teaching model that integrates the concepts of service quality assessment and airport passenger satisfaction in the educational curriculum at the Aviation Polytechnic. The main focus of this research is to design a competency-based learning approach that covers not only theoretical aspects but also practical applications in the context of the aviation industry. In addition, this research also evaluates the effectiveness of the learning model in improving students' understanding of airport service quality parameters. **Method:** used is Research and Development (R&D) with the stages of needs analysis, model design, expert validation, limited trial, and implementation. Data were collected through surveys, interviews with aviation industry stakeholders, as well as pretests and posttests on students to measure the increase in understanding. Data analysis was done quantitatively with descriptive statistics and paired sample t-test, as well as qualitatively through evaluation of learner and expert responses. **Results:** Showed that the developed teaching model significantly improved students' understanding of airport service quality dimensions such as tangibles, reliability, responsiveness, assurance, and empathy. The effectiveness test of the model shows an increase in understanding scores after implementation. **Novelty:** Research lies in the integration between the academic curriculum and the real needs of the aviation industry, especially in terms of service quality measurement and passenger satisfaction. The developed model is also equipped with case studies based on actual data from the airport and interactive simulations, thus providing a more contextualised learning experience. This research is expected to be a reference for the development of aviation vocational education curriculum that is more adaptive to industry dynamics.

INTRODUCTION

The increasingly dynamic development of the aviation industry demands the readiness of competent human resources, especially in the aspect of airport services. The quality of airport services is a determining factor in creating a positive experience for passengers, which ultimately affects their level of satisfaction and loyalty (Darusman, 2020). In the context of vocational education, especially in the Aviation Polytechnic environment, the need for a curriculum that is relevant to industry challenges is becoming increasingly urgent (Christianto, 2017). However, until now, there is still a gap between the teaching materials provided in college and the real needs in the field, especially in terms of service quality measurement and passenger satisfaction analysis (Khairunnisa et al., 2025). This encourages the need to develop a teaching model that is not only theoretical but also applicable, so that graduates can immediately contribute effectively in the world of work.

Airport service quality is a multidimensional aspect that includes various elements, ranging from physical facilities (tangibles) to interactions between airport officials and passengers (assurance and empathy) (Supriyanto, n.d.). These parameters need to be deeply understood by prospective aviation professionals, considering that airports are the main gateway in the air transport industry (Gaol et al., 2016). On the other hand, passenger satisfaction is an indicator of service success that is influenced by many factors, including the efficiency of the check-in process, security, facility comfort, and staff friendliness (Amanda¹, 2023). Understanding these concepts is not enough to be taught conventionally, but needs to be developed through interactive and real case-based learning approaches.

Aviation Polytechnic as a vocational education institution has a strategic role in preparing job-ready graduates (Wulan et al., 2016). However, the main challenge often faced is how to align the education curriculum with the latest developments in the industry (Yahya, 2023). So far, material on service quality and passenger satisfaction is often taught separately and less integrated with hands-on practice (Roellyanti & Jannah, 2022). As a result, many graduates still need additional training when entering the workforce. Therefore, the development of a teaching model that combines theory and practice is a must to ensure that graduates not only understand the concepts, but are also able to apply them in real situations (Faoziah, 2022). This research stems from the need to create an innovative teaching model that can bridge the gap between the world of education and the aviation industry (Suradi et al., 2019). The developed model is expected to be a guide for lecturers in delivering material on service quality and passenger satisfaction in a more interesting and effective way (Maharani & Matthews, 2022). In addition, the model is also designed to improve students' analytical skills through case studies, simulations, and the use of actual data from the airport. Thus, Aviation Polytechnic graduates will have more mature competencies and be ready to face work demands at international airports.

One of the key aspects of this research was the Research and Development (R&D) approach, which enabled the development of the teaching model through a series of systematic stages (Yarahman, 2021). The initial stage of the research involved needs analysis through surveys and interviews with stakeholders, including academics, industry practitioners, and students (Apriani & Nieamah, 2022). The results of this needs analysis were then used to design a teaching model that suits the characteristics of vocational education (Murtadhlo et al., 2025). Next, the model was validated by experts before being trialled on a limited scale (Pratama, 2021). The final stage of the research was the full implementation of the model and evaluation of its impact on students' understanding.

This research is expected to make significant contributions both academically and practically (Rafliansyah, 2021). From the academic side, the developed teaching model can be a reference for curriculum development in the field of aviation, especially those related to service quality management (Sari, 2023). From the practical side, this research will produce graduates who are more work-ready, so that they can fulfil the industry's need for competent professionals (Hatta et al., 2024). In addition, the findings of this research can also be an input for the airport in improving service quality, considering that students who have been equipped with a deep understanding of passenger satisfaction can provide a fresh perspective in service evaluation.

So far, research on service quality and passenger satisfaction has focused more on analysing from a business and marketing perspective, while aspects of education and human resource development have received less attention (Meithiana, 2017). In fact, vocational education has a central role in producing a workforce that is able to answer industry challenges (Kholis et al., 2025). Therefore, this research offers novelty by combining pedagogical approaches and industrial analysis, resulting in a holistic teaching model. In addition, the use of actual data and interactive simulation in learning is also an added value that distinguishes this research from previous studies.

In a broader context, this research is in line with government policy in improving the quality of vocational education to support the growth of the national aviation industry (Aberti, n.d.s). With a relevant and applicable teaching model, it is hoped that a strong synergy between education and industry can be created, which in turn will have a positive impact on improving the quality of airport services in Indonesia (Sumartini & Tias, 2019). In addition, this research also opens up opportunities for further development (Andújar Gran et al., 2018), such as the integration of digital technology in learning or collaboration with international airports for knowledge exchange and best practices.

Thus, this research on the development of a teaching model of testing service quality and airport passenger satisfaction at the Aviation Polytechnic is expected to provide innovative solutions in addressing educational and industrial challenges (Rifai et al., 2022). Through a systematic approach and based on real needs, the resulting model will not only improve the competence of graduates but also contribute to the overall improvement of airport service quality (Sugiyono, 2013). This will ultimately support the realisation of airports in Indonesia that are able to compete at the global level, with excellent services that satisfy passengers.

The Research and Development (R&D) approach was chosen in this study due to its unique ability to bridge the gap between academic theory and the practical needs of the aviation industry. This methodology not only identifies problems through in-depth analysis, but also systematically develops evidence-based solutions that can be implemented immediately. The iterative characteristics of R&D allow for continuous adjustments based on feedback from various stakeholders, including academics, students, and industry practitioners. By combining academic rigor and practical relevance, this approach is specifically designed to create a teaching model that is responsive to the rapid dynamics of the aviation industry while meeting higher education standards. The phased development process in R&D guarantees that the final product truly addresses real challenges in the field while maintaining scientific validity.

RESEARCH METHOD

This research uses a Research and Development (R&D) approach by adopting the ADDIE model (Analysis, Design, Development, Implementation, Evaluation) as a framework for developing teaching models. The ADDIE model was chosen due to its systematic, iterative and comprehensive nature in designing a learning product (Muruganantham, 2015). This approach allows researchers to go through structured stages from needs identification to final evaluation, resulting in a valid, practical, and effective teaching model to be implemented in the Aviation Polytechnic environment.

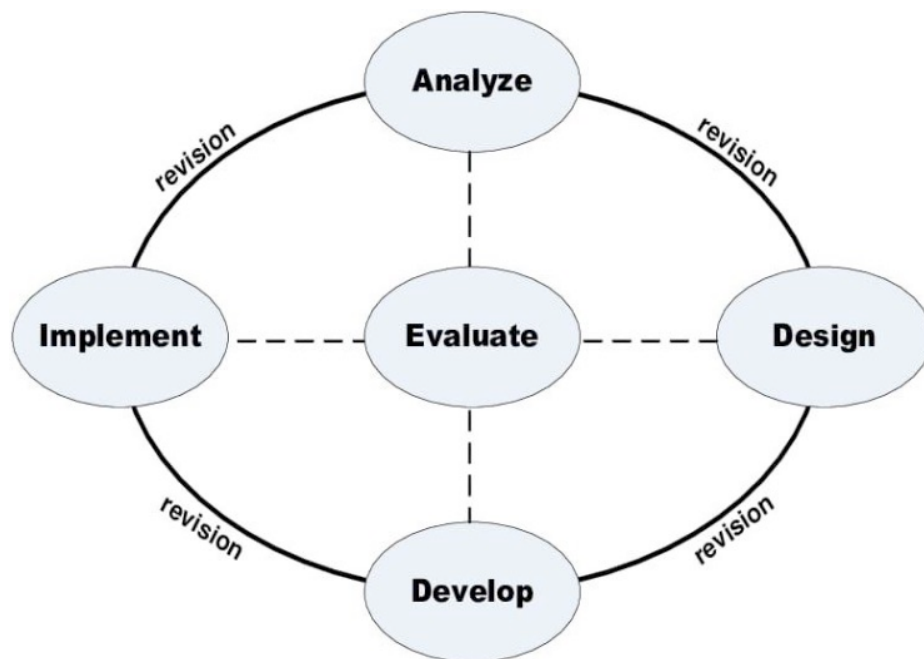


Figure 1. ADDIE concept

The ADDIE model was used as a framework for developing the teaching model through five systematic stages. The first stage is Analysis, where researchers identify learning needs through literature studies, surveys, and interviews with lecturers, students, and industry practitioners (Faisal & Sidik, 2019). The results of the analysis showed the need to strengthen the understanding of the concept of service quality and passenger satisfaction data analysis skills (Bustamante et al., 2022). The second stage is Design, where researchers develop a learning structure including instructional objectives, case study-based material content, blended learning methods, and evaluation instruments (Mueller et al., 2017). This design was validated by pedagogy experts and airport practitioners to ensure suitability with vocational needs.

The third stage is Development, in the form of preparing teaching materials such as student modules, lecturer guidebooks, simulation datasets, and demonstration videos. This product is tested for feasibility through expert testing and limited trials on students. The fourth stage is Implementation, where the model is trialled in an experimental class with an active learning approach through a real data analysis project and role simulation. The last stage is Evaluation, which includes formative assessment during the process and summative at the end of learning (Yang & Zheng, 2016). The evaluation results showed significant improvements in students' concept understanding and analytical skills, while identifying enhancement needs for further technological adaptation.

RESULTS AND DISCUSSION

Results

The first stage in the ADDIE model is needs analysis, which aims to identify fundamental problems related to teaching service quality and passenger satisfaction at the Aviation Polytechnic (Razdan et al., 2023). At this stage, researchers conducted an in-depth literature study on theories of service quality (such as SERVQUAL and the gap

model), passenger satisfaction, and the applicable aviation vocational education curriculum (Cahyadi et al., 2022). In addition, a needs analysis was also conducted through surveys and interviews with three main stakeholder groups: (1) lecturers and teaching staff to understand the limitations of the teaching methods that have been used so far, (2) students to find out their difficulties in understanding related materials, and (3) industry practitioners (such as airport managers and passenger service staff) to identify competencies needed in the field. Qualitative data from the interviews were analysed thematically, while quantitative data from the survey were processed with descriptive statistics to determine model development priorities (Dominique, 2021). The analysis results showed that most students had difficulty applying theoretical concepts in real case studies, while industry complained about graduates' lack of analytical skills in evaluating passenger satisfaction. These findings form the basis for designing solutions at a later stage.

Table 1. Results of descriptive analysis of data Check in counter, AVSEC, Aviation Safety, Support, Baggage on passenger satisfaction at Sultan Hasanuddin Airport Makassar

		Chek in Counter	AVSEC	Aviation Safety	Support	Bagasi	Passenger Satisfaction
N	Valid	140	140	140	140	140	140
	Missing	0	0	0	0	0	0
Mean		54,96	78,43	64,92	59,72	57,83	62,92
Standard Error		0,66	0,72	0,59	0,72	0,63	0,52
Median		56	78	64	62	74	67
Mode		56	83	62	62	62	62
Standard Deviation		7,805	8,511	6,985	8,965	7,882	6,785
Sample Variance		60,91	72,45	48,79	48,79	48,79	48,79
Kurtosis		1,854	-0,277	-0,355	-0,355	-0,355	-0,355
Skewness		-1,026	-0,113	-0,163	-0,163	-0,163	-0,163
Range		37	39	30	30	30	30
Minimum		32	59	48	48	48	48
Maximum		69	98	78	78	78	78
Sum		7640	10902	9025	9025	9025	9025
Count		139	139	139	139	139	139

Table 1 is a descriptive description of the variables check in counter, AVSEC, Flight Safety, Support, Baggage to passenger satisfaction. The average Mean check in counter value is 54.96, AVSEC mean value is 78.43, Flight safety mean value is 64.92, Support mean value is 59.72, baggage mean value is 57.83 and passenger satisfaction value is 62.92. The median value of check in counter is 56, AVSEC 78, flight safety 64, support 62, baggage 74 and passenger satisfaction 64. The mode value of check in counter is 56, AVSEC 83, flight safety 62, support 62, baggage 74 and passenger satisfaction 62.

Based on the results of the analysis, the design stage focused on developing a blueprint for the teaching model that included learning objectives, material structure, delivery methods, and evaluation instruments (Dogadina et al., 2021). Learning objectives were formulated to cover three aspects: cognitive (theoretical understanding), psychomotor (data analysis skills), and affective (professional attitude in passenger service). The material structure is divided into five main modules: (1) Basic Concepts of Airport Service Quality, (2) Service Quality Measurement Models (SERVQUAL, IPA, etc.), (3) Passenger Satisfaction Survey Techniques, (4) Data Analysis and Interpretation of Results, and (5) Field Case Studies. The delivery method is designed in a blended manner, combining interactive lectures, international airport data-based case studies,

role-play simulations, and practice using analytical tools such as SPSS or Excel. To ensure compatibility with industry needs, each module is equipped with scenario-based learning that takes real examples from partner airport passenger satisfaction reports. Evaluation instruments include pretest-posttest, data analysis project assessment, and feedback from industry practitioners who are involved as guest lecturers. The draft design was then validated by two pedagogy experts and one airport practitioner through Delphi technique to refine the content and methodology.

Passenger Satisfaction, if in the absence of independent variables (X_1 to $X_5 = 0$), passenger satisfaction is only a certain value, while if each respondent's answer increases by 1 point for the answer to the independent variable (X_1 to $X_5 = \text{increased}$), it is estimated that the level of passenger satisfaction tendency increases.

However, if calculated simply, the multiple regression formula is as follows:

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 \dots\dots\dots (1)$$

Where:

Y = Passenger Satisfaction

$a, b_1, b_2, b_3, b_4, b_5$ = constant

X_1 = Chek In Counter

X_2 = Avsec

X_3 = Aviation Safety

X_4 = Support

X_5 = Bagasi

At this stage, all components of the model that have been designed are realised in the form of ready-to-use teaching materials, including:

1. The Lecturer's Manual contains lesson plans, presentation slides, and assessment rubrics.
2. Student Module equipped with case examples, practice exercises, and practice guides.
3. Simulated dataset from an international airport passenger satisfaction survey (data anonymised to maintain confidentiality).
4. Video demonstrations of passenger interview techniques and the use of analytical tools.

The products were then tested for feasibility through expert testing by two aviation management lecturers and one vocational curriculum expert (Sabur et al., 2023). The aspects assessed included the accuracy of the material, suitability to the student level, and ease of implementation. Revisions were made based on expert input, such as the addition of low-cost carrier airport case examples to broaden students' perspectives. In addition, a limited trial was conducted with 30 students to evaluate the clarity of the material and the time required. The trial results showed that 85% of participants were able to understand the material in modules 1-3 without significant difficulty, while modules 4-5 required additional mentoring sessions.

The implementation of the model was conducted in a parallel class at Aviation Polytechnic for one semester. A total of 60 students were divided into experimental class (using ADDIE model) and control class (conventional method). The learning process in the experimental class involved:

- Introductory phase with guest lecture from airport manager.
- Active learning through analysing real datasets using software.

- Field simulation where students act as airport officers and passengers.
- The final project is the preparation of a service quality evaluation report based on the primary data they collected.

To monitor the consistency of implementation, researchers used observation logbooks and field notes. Obstacles such as limited access to real-time data were overcome by collaborating with partner airports that provided historical data.

Evaluation is done formatively (during the process) and summatively (at the end of the semester). Formative evaluation includes:

- Weekly student reflection through learning journals.
- Short quiz to monitor understanding.
- FGDs with lecturers on technical issues.

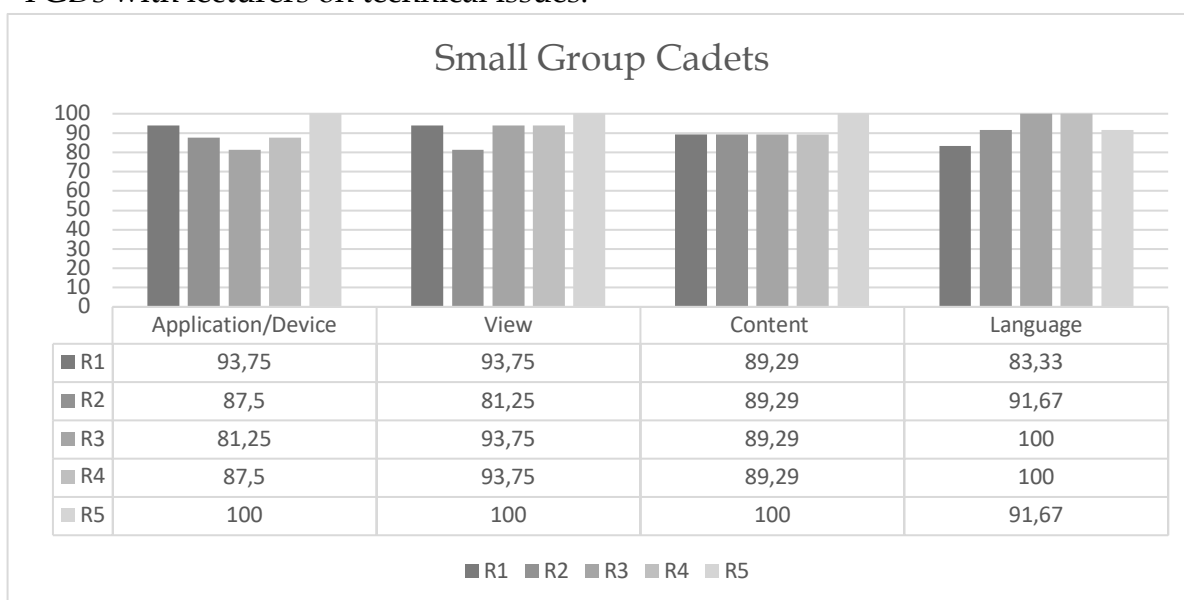


Figure 4. Student Testing

Discussion

The success of the model was also measured by the level of achievement of competency indicators, where 78% of experimental class students were able to achieve all indicators vs. 45% in the control class. This finding confirms that the ADDIE model is effective in improving student competence holistically. The N-Gain value is 0.77 or in the high category, so it can be concluded that the airport management service model has been effective in its use.

The results of this study are consistent with the results of research conducted by (Nugraha. dkk, 2024) with the results of research showing that baggage handling has a significant effect on passenger satisfaction at Juanda Surabaya International Airport with the results obtained value $14.843 > 1.985$. With the results of the correlation coefficient of 0.692 and the coefficient of determination of 69.2% with the remaining 30.8% influenced by other factors not examined by the researcher, so that this theory can be proven by the analysis that has been done. The service quality model after multiple linear regression analysis is carried out, then to see the magnitude of the influence, the coefficient of determination analysis can be carried out, namely the coefficient of determination of the

individual to measure separately. Meanwhile, whether the effect is significant or not can be seen from the results of the F test with a confidence level of 95% or $\alpha = 0.05\%$.

CONCLUSION

Fundamental Findings: This study successfully proved that the ADDIE-based teaching model significantly improved Aviation Polytechnic students' competency in analysing service quality and airport passenger satisfaction. Key findings show improvements in conceptual understanding and practical skills through a blended learning approach that integrates real case studies, interactive simulations, and field projects. These results reinforce the initial findings that vocational education requires a learning model that integrates with industry needs, especially in the context of increasingly complex airport service dynamics. **Implications:** The findings of this study have three-dimensional strategic implications: (1) for vocational education, this model offers a curriculum framework that is adaptive to industry developments; (2) for airport practitioners, producing graduates with better work readiness; (3) for education policy, providing empirical evidence of the effectiveness of the R&D approach in curriculum development. In particular, the integration of actual data and the involvement of practitioners in the learning process proved to be able to bridge the theory-practice gap which has been a major challenge. **Limitations:** This study has several limitations that need to be recognised: (1) the trial was limited to one polytechnic with a relatively small sample (60 students); (2) the reliance on historical data of partner airports which may not reflect real-time conditions; (3) the need for intensive resources for replication of the model in other institutions. These limitations do not diminish the validity of the findings, but are important to consider in wider applications. **Future Research:** For future development, three research recommendations are proposed: (1) exploration of the integration of immersive technologies (VR/AR) for more realistic simulation of airport situations; (2) longitudinal studies to measure the long-term impact of the model on graduates' performance in the workforce; (3) adaptation of the model for regional airport contexts with different passenger characteristics. These follow-up studies will further enrich innovation in aviation vocational education. To conclude, this research not only successfully proved the effectiveness of the ADDIE model in the specific context of aviation education, but also provided a blueprint for the transformation of vocational education that is more responsive to industry needs. The successful implementation of this model signalled the need for a new paradigm in teaching industrial competence - where the classroom and the world of work are no longer separate entities, but rather organically integrated ecosystems. This is the most important legacy that this research aims to leave for the future of vocational education in Indonesia.

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