



# **Resource Adequacy and Learning Environment Assessment for Aircraft Maintenance Technology Students at Indiana Aerospace University**

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## **Abstract**

This quantitative study aimed to assess the adequacy and effectiveness of Indiana Aerospace University's resources for its Aircraft Maintenance Technology (AMT) program during the academic year 2023–2024. Specifically, the study evaluated the quality and accessibility of laboratories, workshops, simulators, and networking opportunities as AMT students and faculty perceived. Using a descriptive research design, data were gathered through structured surveys involving 50 student respondents across all year levels. The research instrument measured respondents' perceptions using a five-point Likert scale, and the data were analyzed using weighted means and ranking. Findings revealed that students generally held a neutral stance regarding the adequacy of the university's laboratories, simulators, and networking opportunities. Although some students agreed that specific resources, such as laboratories, were beneficial for hands-on training, they reported issues such as outdated equipment, limited simulator availability, and inflexible laboratory schedules. The study concluded that while Indiana Aerospace University's AMT program meets basic educational needs, there are significant areas for improvement to enhance the quality of instruction and training. The researchers recommend infrastructure expansion, procurement of additional simulators, regular maintenance schedules, flexible laboratory access, and increased financial support for student participation in industry-related networking events based on these findings. Implementing these recommendations will help align the program more closely with aviation industry standards and prepare students for professional success.

**Keywords:** *aircraft maintenance technology, educational resources, aviation training, simulators, laboratory facilities*

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## **Introduction**

The Federal Aviation Administration (FAA) Extension, Safety, and Security Act of 2016, specifically Section 2102 on Cockpit Aircraft Maintenance Technology (AMT) is a highly technical field that demands a specific set of skills to uphold the stringent safety standards of the aviation industry. Proper equipment and facilities are essential to ensure that students can safely perform tasks that meet the regulatory requirements set by aviation authorities. Maintenance students must become proficient with tools and hardware commonly used in aviation maintenance, such as torque wrenches, power drills, and avionics testing equipment. Without adequate resources, they may struggle to meet the competency levels required by industry standards and aviation authorities like the Federal Aviation Administration (FAA) in the United States and the European Union Aviation Safety Agency (EASA).

In the Asia–Pacific region, the Maintenance, Repair, and Overhaul (MRO) market is projected to remain the largest globally, with an expected annual increase of 0.8% from 2024 to 2034, accounting for 32% of the global market. Consequently, MRO providers will rely on well-trained mechanics and technicians to achieve safety and operational standards (Leblanc, Tarleton, & Johnston, 2024). In the Philippines, the Civil Aviation Authority of the Philippines (CAAP) emphasizes the importance of practical experience in training programs. However, many institutions face challenges in accessing modern aircraft, engines, or avionics systems that reflect current industry standards (Civil Aviation Authority of the Philippines [CAAP], 2008).

Indiana Aerospace University, located in Lapu-Lapu City, strives to comply with the standards set by CAAP by providing aircraft laboratories, flight simulators, and grounded aircraft for hands-on learning. Evaluating the university's resources for the Aircraft Maintenance Program is grounded in theoretical and legal frameworks. Specifically, it aligns with the standards set by CAAP's Philippine Civil Aviation Regulations (PCAR) Part 3, which outlines the requirements for resources and facilities in Aircraft

Maintenance training centers (CAAP, 2008).

This study aims to evaluate and ensure that the resources allocated to Indiana Aerospace University's AMT program are adequate and effective. This includes assessing the quality of facilities, equipment, faculty, and industry partnerships to confirm that they meet industry standards and fulfill the program's educational objectives. Ultimately, the study aims to enhance the program's capability to provide high-quality training that prepares students for successful careers in aircraft maintenance.

The research is also anchored in several theoretical frameworks. Experiential Learning Theory emphasizes the importance of hands-on learning experiences in developing practical skills (Bartle, 2015). Self-Confidence Theory highlights the role of confidence in one's performance and skills, suggesting that self-belief can significantly impact learning outcomes (Ericsson et al., 1993). Additionally, studies have shown that improving aircraft safety and reliability is closely linked to the quality of AMT training, underscoring the importance of comprehensive educational programs (Dalkilic, 2017).

Despite these efforts, AMT students have reported issues regarding the availability of resources. Challenges include limited hardware for hands-on training, a lack of available classrooms leading to canceled classes, and a shortage of instructors resulting in packed classrooms and limited subject time slots. As a leading institution in aviation education, Indiana Aerospace University must address these concerns to ensure that it meets the needs of its growing student population.

This study is significant as it seeks to improve the quality of instruction in Indiana Aerospace University's AMT program. By assessing available resources, the program can ensure that it satisfies modern educational requirements and effectively prepares students for careers in the aviation sector. Enhancing the learning environment will contribute to more successful educational outcomes and better-equipped graduates.

### **Research Question/ Objectives**

The study aims to assess the Indiana Aerospace University resources for its aircraft maintenance technology program for 2023-2024 and propose an action plan. Specifically, it aimed to answer the following sub-problem.

1. Assess the Indiana Aerospace University resources for its aircraft maintenance technology program regarding laboratories, workshops, simulators, and networking opportunities.

## **Methodology**

### **Research Design**

The researchers employed a descriptive research design to assess the adequacy of resources available for the Aircraft Maintenance Technology (AMT) program at Indiana Aerospace University (IAU). This design was chosen to describe and analyze the existing conditions and experiences of the students regarding laboratories, simulators, and networking opportunities.

The study was conducted at IAU's 15-hectare campus located in Basak Kagudoy Road, Lapu-Lapu City, Cebu, Philippines. Formerly known as the Indiana School of Aeronautics, the institution transitioned into a university in 2000, signifying its expansion and dedication to aerospace education. The campus housed advanced simulation technologies, modern classrooms, and practical training areas, supporting the growth of aviation programs such as Aircraft Maintenance Technology, Avionics, and Aerospace Engineering.

### **Participants/Respondents**

The respondents consisted of AMT students across different year levels—first-year, second-year, third-year, and fourth-year students—all of whom had hands-on laboratory and on-the-job training experience. The primary data collection instrument was a researcher-made questionnaire designed to gather both quantitative and qualitative insights. The questionnaire had three sections: respondent profiles (age, gender, and year level), assessment of the university's resources (rated on a five-point Likert scale from Strongly Disagree to Strongly Agree). To enhance the validity of the findings, the researchers also conducted scheduled interviews to gather deeper insights.

### **Procedure**

Data were collected through in-person surveys administered over a three-day period, with each respondent allocated 10 to 20 minutes to complete the form. The research team was present to assist and ensure accurate responses. After collection, the data were encoded and securely stored for analysis. The statistical treatment of data involved computing the weighted mean to interpret students' perceptions of resource adequacy. This approach allowed the researchers to derive descriptive equivalents and overall interpretations, effectively quantifying the level of satisfaction and identifying key areas needing improvement in the AMT program's delivery and infrastructure.

## **Results**

A laboratory is a controlled environment equipped with specialized tools for scientific research, experiments, and analysis, while a workshop is a space designed for hands-on activities like manufacturing, crafting, or repair work, often involving tools and machinery. Both are essential for practical learning and development in scientific, technical, or craft based fields, enabling experimentation, skill-building, and innovation.

Table 1 represents the assessment of resource in terms Laboratory and workshop.

Table 1. *Laboratory and Workshop*

<i>Laboratories and Workshop</i>	<i>Weighted Mean</i>	<i>Description</i>
1. The laboratories and workshops at Indiana Aerospace University are not equipped with up-to-date tools and equipment necessary for hands-on training.	3.70	Agree
2. The number of workstations in the laboratories and workshops is insufficient for the number of students in the program.	3.42	Agree
3. There is inadequate access to laboratories and workshops during times that fit my schedule.	3.36	Neutral
4. The laboratory and workshop facilities are not regularly maintained and kept in good condition.	2.92	Neutral
5. Indiana Aerospace University's laboratories and workshops are not safe and secure environments.	2.68	Neutral
Average Weighted Mean	3.22	Neutral

Legend: 4.21 - 5.0, Strongly Agree; 3.41 - 4.20, Agree; 2.61 - 3.40, Neutral; 1.81 - 2.60, Disagree; 1.0 - 1.80, Strongly Disagree

## Simulators

A simulator is a device or software designed to replicate real-world conditions for training, experimentation, or analysis without the risks or costs associated with the real environment. Simulators are widely used in aviation, military, medical training, and driving schools to mimic real-life experiences and scenarios in a controlled and safe way.

Table 2 represents the assessment of resource in terms Simulators

Table 2. *Simulators*

<i>Simulators</i>	<i>Weighted Mean</i>	<i>Description</i>
1. There are not enough simulators available to meet the needs of all students in the program.	3.36	Neutral
2. Indiana Aerospace University's simulators are not sufficient to accommodate the Aircraft Maintenance Technology population.	3.36	Neutral
3. The simulators available in the Aircraft Maintenance Technology program do not provide realistic and effective training experiences.	2.88	Neutral
4. The use of simulators has not improved my understanding of aircraft maintenance procedures.	2.76	Neutral
5. The simulators are not well-maintained and often malfunction during use.	2.62	Neutral
Average Weighted Mean	3.00	Neutral

## Network Opportunities

A network opportunity refers to the potential to establish or strengthen connections within a network, often in the context of business, technology, or personal relationships.

Table 3 represents the assessment of resource in terms Network Opportunity.

Table 3. *Network Opportunity*

<i>Networking Opportunities</i>	<i>Weighted Mean</i>	<i>Description</i>
1. Indiana Aerospace University's networking opportunity events are not accessible to all in financial terms (Entrance or admission fees).	3.20	Neutral
2. The current laboratory setup does not enhance my ability to engage in network-related projects within the aviation sector.	2.80	Neutral
3. Guest lectures and industry events organized by the program have not expanded my professional network.	2.72	Neutral
4. Internship opportunities provided through the program have not helped me gain practical experience in the field.	2.70	Neutral
5. The networking opportunities offered by the A plus program has not enhanced my career prospects in the aviation industry.	2.60	Neutral
Average Weighted Mean	2.80	Neutral

## Conclusion

The study concluded that while Indiana Aerospace University's Aircraft Maintenance Technology (AMT) program provides essential training for students, several resource-related gaps affect the overall quality of education. Respondents expressed neutral perceptions regarding the adequacy of laboratories, simulators, and networking opportunities. Key concerns included outdated equipment, insufficient simulators, and limited practical access, all of which are vital to hands-on learning in the aviation industry. Furthermore, students reported that the existing networking events and internships lacked accessibility and professional relevance, potentially limiting their career growth and industry exposure.

The most pressing problems identified were the insufficient number of laboratory workstations, limited availability of simulators, and financial barriers to participating in networking opportunities. Additionally, poor maintenance of facilities and inflexible access schedules hindered students' ability to gain the practical experience necessary for developing technical competencies. These issues suggest a gap between the current state of institutional resources and the demands of modern aircraft maintenance education, which

could impact graduates' readiness for professional practice in a competitive industry.

To address these challenges, it is recommended to expand the number of workstations by repurposing available classroom spaces into functional laboratories and acquiring additional simulators to accommodate more students. Regular facility maintenance schedules should be implemented to ensure the quality and reliability of training environments. Additionally, improving access to networking events by subsidizing or eliminating fees can help foster industry engagement. Flexible scheduling and additional supervision for lab sessions should also be considered to maximize access and support students' learning needs. These interventions, if implemented, can significantly enhance the AMT program's capacity to deliver industry-relevant education and produce competent aviation professionals.

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