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Examining the Relationship Between AMT Instructor Experience and Student Pass Rates: A Synthesis of Regulatory Standards and Educational Outcomes

Richard L. Johnson
Liberty University

Brooke E. Wheeler
Florida Institute of Technology

This correlational study examined whether Aviation Maintenance Technician (AMT) instructor experience predicts student pass rates in 14 Code of Federal Regulations (CFR) Part 147 programs. The study investigated whether months of real-world A&P-rated maintenance experience prior to teaching were associated with student success on Airman Certification Standards (ACS) subject areas. Data were collected from 19 U.S. campuses, yielding a final sample of 67 complete responses. Pearson's correlation revealed no statistically significant linear relationship between instructor experience and student pass rates, $r(66) = .06$, $p = .31$. A supplemental analysis compared instructors who possessed an Inspection Authorization (IA) endorsement with those who did not. Due to the assumption of normality violation, a one-tailed Mann-Whitney *U* test was conducted and indicated a statistically significant difference between the groups ($U = 366$, $z = -1.65$, $p = .05$). Descriptive findings suggested a paradox of experience: instructors with advanced credentials and experience showed lower pass rates than their peers. Reliability analysis indicated fair agreement between self-reported and institutional data ($ICC = .52$), which is acceptable for exploratory research. This study was the first to examine this relationship in Part 147 programs and established a baseline on AMT instructor qualifications. The findings suggest that experienced instructors may emphasize more rigorous standards than less-experienced instructors. The results suggest that experience alone does not predict student performance, supporting further investigation into instructional effectiveness, assessment practices, and qualification standards in aviation maintenance education.

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Introduction

The aviation maintenance industry currently operates within a regulatory gap. Flight training programs under 14 Code of Federal Regulations (CFR) Part 141 are governed by more regulated oversight, including formal instructional expectations and safety systems, more standardized oversight structures and instructor expectations, while 14 CFR Part 147 maintenance schools do not require an equivalent instructor credential or experience benchmark (FAA, 2020, 2022, 2024). This creates a situation in which a newly certificated A&P mechanic may begin teaching without substantial real-world maintenance exposure or training in teaching or instruction assessment. Instructors with limited or no real-world maintenance exposure can teach future technicians. That issue matters because aviation maintenance is safety-critical, and human error in maintenance remains a significant contributor to aviation risk. This gap raises concerns about whether classroom success reflects true readiness for operational aircraft work (Cheng, 2018; Gramopadhye & Drury, 2000; Olaganathan, 2024).

The rationale concerning these expectations is similar to Certified Flight Instructor (CFI) training with student pilots. Unlike the AMT student, a CFI has real-world operational hours. Every hour of a pilot's sub-300-hour journey to becoming a CFI is spent actively operating a real aircraft in the actual National Airspace System under the privileges of their own pilot certificate. Conversely, an A&P student's 1,900 hours are accumulated in a controlled, non-operational classroom and lab training environment as a student. To become a CFI, there are also pedagogical training requirements. An applicant must explicitly study the Fundamentals of Instructing (FOI), pass a dedicated FAA knowledge test on teaching methodologies, and demonstrate instructional proficiency during a practical test. Currently, there is a lack of mandated teaching training for AMTs. In stark contrast to the CFI, there is currently no federal instructional or pedagogical training requirement to become an AMTS instructor. The point of comparison hinges on the fact that the CFI is explicitly trained on *how to teach*, a qualification that is entirely nonexistent as a regulatory mandate for the A&P instructor. In the same regard, an Inspection Authorization (IA) holder derives their legal authority to *supervise* others from 14 CFR § 65.95 and 14 CFR § 43.3(d). Similar in essence to the oversight and supervision executed on behalf of a CFI over a student. The "type" of experience possessed by the instructor denotes more than merely "industry time." CFI experience has been found to have a positive effect on student success (Polstra, 2012). The additional endorsements held by an instructor demonstrate greater depth of knowledge and experience of various types. The Inspection Authorization (IA) and Designated Mechanic Examiner (DME) instructors may hold students to a higher level of rigor to better ensure Federal Aviation Administration (FAA) exam preparation. In some instances, although pass rates might be lower, the student might be better equipped to pass FAA exams if held to a stricter standard throughout the course of training by a more experienced instructor. This rationale is similar in application to the CFI practice; an instructor might hold a student pilot back in order to best prepare them for a stage check.

This study was grounded in the Law of Primacy, which holds that the first procedures learned are the most enduring. In maintenance education, this means the first instructor's habits and standards can shape how future technicians think about airworthiness, risk, and Return-to-Service (RTS) decisions (Jones, 2021; Olcott, 2022). If the first exposure is weak, students may internalize an incomplete or overly classroom-based understanding of maintenance performance rather than one rooted in operational reality. If an instructor's background is limited to training environments rather than operational airworthy maintenance and standards, the resulting instruction may emphasize task completion without fully developing the situational awareness and risk reasoning required for return-to-service decisions (Endsley, 1994; Eraut, 2000).

The purpose of this study was to explore whether AMT instructor experience predicts student pass rates in Part 147 schools. The research also examined whether more experienced instructors, especially those holding IA or DME credentials, produce different pass-rate patterns than less experienced instructors. Prior aviation education research suggests that instructor quality and experience can matter, but the relationship is not always linear or obvious (Polstra, 2012; Hoffmann & Oreopoulos, 2009; Marsh, 2007).

Regulatory context

Current FAA guidance creates a clear contrast between instructor expectations in flight and maintenance education. Under AC 147-3C, instructors holding an A&P certificate only need to hold the appropriate rating for the subject they teach, while "specifically qualified" instructors without an A&P certificate must document practical experience (FAA, 2022). Some schools even go as far as quantifying 14 CFR Part 147 "seat time" as a student as "experience." This current asymmetry structure is striking and creates a paradox in which noncertificated instructors must prove competence through experience, while certificated instructors may teach immediately after graduation without comparable field exposure; instructors who may have little or no field time.

FAA regulations also distinguish between training exposure and practical experience under § 65.77, and the exposure of each is not equivalent when the goal is to prepare students to work to RTS standards (FAA, 2024; Johnson, 2025; Johnson & Wheeler, 2025). The study also examined § 65.77 and § 65.93 because they illuminate the broader issue of practical experience and maintenance authority (FAA, 2024). Section 65.93 is especially important because IA renewal requires continuing maintenance involvement, making the IA one of the few credentials tied directly to active industry practice (FAA, 2024). That makes the IA a useful benchmark for instructors in a safety-critical educational setting. The FAA has repeatedly clarified that attending a refresher seminar is insufficient if the IA is not actively engaged in maintaining certificated aircraft. Additional verbiage concerning interpretation of "actively engaged" is also found in the Federal Register Policy Clarification for "Actively Engaged" (76 FR 47423). For this reason, the IA was treated in this study as a benchmark for validating real-world experience. Related FAA and safety-management literature supports the broader idea that structured oversight improves training quality and safety culture (Adjekum, 2017; Adjekum & Tous, 2020; FAA, 2015).

Literature review

Competency-based training (CBT) emphasizes performance, but competence is more than task completion or procedural performance. CBT requires contextual judgment, tacit knowledge, and the ability to apply skills within changing operational conditions and ambiguous situations (Day, 2017; Hager, 2017; Hodge et al., 2020; Wheelahan, 2019). In aviation maintenance, that distinction is vital because instructors must teach not only how to perform a task, but why the task matters within the larger system of airworthiness and safety. Hermeneutic and competence-based perspectives both support the idea that meaningful expertise requires more than time in a classroom or simulated environment (Eraut, 2000; Hodge, 2017).

Research on aviation education has repeatedly shown that experience and instructor quality matter, though the effect can be indirect, and the relationship is often indirect or masked by institutional structures. Studies on flight instruction found that instructor experience can influence training efficiency and student progress, while other higher-education research suggests that teacher quality affects student outcomes under certain conditions (Carrell & West, 2009; Hoffman & Oreopoulos, 2009). In student pilot training, Polstra (2012) found that flight instructor experience was related to training outcomes. In aviation maintenance education specifically, earlier research found limited differences in exam performance between program types, which suggests that program structure may compress variation at the institutional level (Summey et al., 2004). However, newer work argues that instructor background, curricular alignment, and human factors training still matter for how students internalize safety and professional judgment. More recent aviation research has emphasized the importance of instructional design, safety culture, and human factors in maintenance education (Johnson, 2023, 2024; Johnson & Wheeler, 2025; Yother et al., 2023, 2025).

The safety literature further supports the study's premise and reinforces the importance of experience. Maintenance errors are influenced by human factors such as fatigue, communication breakdowns, incomplete knowledge, and weak procedural judgment (Cacciabue & Cassani, 2011; Chang & Wang, 2009; Gunes et al., 2020; Marx & Graeber, 1994; Rashid et al., 2014). Because safety management systems (SMS) are designed to identify and reduce these weaknesses, the absence of similar structure in Part 147 instructor qualification raises concern (Adjekum, 2017; Adjekum & Tous, 2020). SMS research in collegiate aviation similarly suggests that structured oversight and safety culture shape training behavior and outcomes (Adjekum, 2017; Adjekum & Tous, 2020). These findings support the present study's focus on the relationship between practical maintenance experience and instruction quality.

Methodology

The study used a quantitative correlational design to assess the relationship between months of A&P-rated industry experience and average student pass rates for ACS subject areas. A supplemental analysis examined whether there was a difference in pass rates between AMT instructors who possess an IA endorsement and those who did not. Participants were AMT instructors at Aviation Technician Education Council (ATEC) registered schools across 19 campuses in multiple U.S. regions. Data were collected via Qualtrics using purposive and snowball sampling and cross-checked with school Learning Management System (LMS) records to improve accuracy. The original sample contained 114 respondents, but incomplete records were removed, leaving a final sample of N ==$N = 67$. This attrition rate was accounted for in the interpretation of the findings.

The predictor variable was months of AMT industry experience prior to entering the classroom. The dependent variable was student pass rate, defined as the number of students passing divided by the number enrolled, averaged across the one to three most frequently taught Airmen Certification Standards (ACS) courses during the 2024 calendar year. Because pass-rate data were not normally distributed, the analysis used bootstrapping to support the inferential statistics. The study also used an Intraclass Correlation Coefficient (ICC) to compare self-reported and institutional records, yielding an $ICC = .52$, which suggests fair agreement for exploratory educational research (Cicchetti, 1994). Because pass-rate data violated normality, bootstrapping was used to support the Pearson correlation analysis (Efron & Tibshirani, 1993). Threats to internal validity were managed through standardized survey prompts, cross-checks with school records, regional sampling diversity, and a fixed one-year window to reduce history effects. These strategies reflect standard educational research practice and are consistent with general research design guidance (Ary et al., 2010; Cohen, 1988; Faul et al., 2007). The question explored in the supplemental analysis was as follows: a) Is there a difference in pass rates between AMT instructors who possess an IA endorsement and those who do not? The null hypothesis for the supplemental analysis (a) was that there would be no statistical difference in pass rates between AMT instructors who possess an IA endorsement and instructors who do not; the research hypothesis was that AMT instructors who possess an IA endorsement would have a lower pass rate than AMT instructors who did not possess the IA endorsement. The Mann-Whitney U test of the instructor pass rates identified a statistically significant difference between IA ($M = .94$) and non-IA ($M = .96$), $U = 366$, $z = -1.65$, $p < .045$. These findings indicated that the pass rate for IA-endorsement instructors was lower. Therefore, the null hypothesis was rejected.

Results

The instructor sample reflected an aging workforce, with many respondents older than 50. Most instructors were male and White, and most held at least a bachelor's degree. A substantial proportion of instructors entered teaching through civilian or mixed civilian-military pathways. The major inferential result was that instructor experience did not significantly predict student pa($r(66) = .06, p = .31$. The mean industry experience was 253.54 months, and mean student pass rate was .95. The pass-rate distribution was highly compressed, suggesting restricted range and a possible ceiling effect. Inferentially, the study found no significant linear relationship between instructor experience and student pass rates, $r(66) == .06, p = .31$. The null hypothesis was not rejected. A Shapiro-Wilk test indicated non-normality, which supported the use of bootstrapping in the analysis. Instructors with IA, DME, or CFI credentials showed slightly lower average pass rates than non-endorsed instructors, which suggests that higher professional standards may have produced more rigorous grading rather than worse teaching (Johnson, 2026). The evidence suggests that the more experienced instructors are, the harder the grades; these findings are supported and illustrated within the Appendix (see Appendix A).

Several descriptive patterns are important. The questionnaire gathered an array of experience (quantified in several ways, including teaching experience), kind, type, and number of maintenance tasks performed, and inspections executed, type of training, etc., for a complete overview of the spread of information gathered within the questionnaire; see Appendix B. Instructors with IA, DME, or CFI credentials had slightly lower mean pass rates than instructors without those endorsements. Instructors with real-world maintenance experience on airworthy aircraft also showed slightly lower or comparable pass rates, which may reflect more rigorous grading; an emphasis on personal and overarching maintenance and safety concerns pertaining to the operational maintenance industry rather than lower instructional effectiveness (Johnson, 2026). Participants possessing different forms of real-world experience overall held slightly lower pass rates than those who lacked real-world experience. These comparisons are expressed in the following examples. Group 1 represents instructors who held maintenance experience on airworthy aircraft, and Group 2 those who did not. Group 1 ($M = .95$, $SD = .04$) scored lower than Group 2 ($M = .97$, $SD = .04$); the first Group 1 had a lower pass rate than Group 2 by 2 points. For instructors who lacked experience on airworthy aircraft, the pass rate was two points higher. A second group focused on annual inspection experience. Group 1 represents instructors who had performed an annual inspection on airworthy aircraft, and Group 2 those who did not. Group 1 ($M = .95$, $SD = .04$) scored lower than Group 2 ($M = .96$, $SD = .03$); Group 1 had a lower pass rate than Group 2 by 1 point. For instructors who lacked experience performing annual inspections on airworthy aircraft, the pass rate was one point higher.

Major alterations are another example of more in-depth maintenance knowledge and experience. Group 1 represents instructors, who possessed experience performing major alterations on airworthy aircraft, and Group 2 those who did not. Group 1 ($M = .95$, $SD = .04$) scored lower than Group 2 ($M = .97$, $SD = .03$); Group 1 had a lower pass rate than Group 2 by 2 points. For the instructors who did not perform major alterations on airworthy aircraft, the pass rate was two points higher.

Endorsements quantify a benchmark in experience and expertise. The two additional maintenance endorsements that currently exist for AMTs are the IA and DME. These endorsements encompass some of the specific “type” of experience possessed by the instructor and denote more than just “industry time.” The IA and DME instructors may hold students to a higher standard of rigor to better ensure exam preparation. Curiously, two of the comparison groups with the lowest pass rates were the groups that held both the IA and DME endorsements. This rationale is similar in application to the CFI practice with student pilots. CFI experience has been found to have a positive effect on student success (Polstra, 2012).

Group 1 represents instructors who held the IA endorsement, and Group 2 those who did not. Group 1 (M = .94, SD = .05) scored lower than Group 2 (M = .96, SD = .03); Group 1 had a lower pass rate than Group 2 by 2 points. Group 1 represents instructors who held the DME endorsement, and Group 2 those who did not. Group 1 (M = .93, SD = .06) scored lower than Group 2 (M = .96, SD = .04); Group 1 had a lower pass rate than Group 2 by 3 points. The IA-endorsed AMT instructors had the same average pass rate as the instructors who possessed the CFI endorsement (M = .94, SD = .02). The results of the supplemental test suggest that group membership of maintenance endorsements had a meaningful impact on pass rates. These findings give credence to the notion of varying facets of instructor experience, which contribute to student success. In this instance, the integration of instructor experiences presented itself in the effect upon pass rates and overall student success. Similar in effect to the CFI endorsements and experience have upon student pilots (Polstra, 2012). The instructors, who possess greater maintenance knowledge, hold a higher standard for the student; thus, a lower pass rate is obtained. Likewise, the instructor also possesses a greater depth of knowledge and a fuller scope of understanding of systems and subsystems. In this instance, the instructor knows the potential real-world implications as related to maintenance practices and safety implications. These interpretations also align with the increased level of knowledge and endorsement, as the DME is the highest maintenance endorsement and had a lower pass rate than the instructors, who possessed an IA. If an AMT instructor holds an A&P license but has never touched an airworthy aircraft, the instructor is incapable of assessing the competency of work performed (Johnson, 2024; Johnson & Wheeler, 2025).

These examples reinforce the idea that the type of experience an AMT possesses can affect, in part, pass rates. Overall, participants with real-world experience (quantified in different facets) had slightly lower pass rates than those who did not. These preliminary comparisons could suggest a potentially higher standard was maintained by instructors with experience. An overview of group comparisons to the mean pass rates is presented in the Appendix (see Appendix A).

A small number of instructors reported teaching with limited practical experience, including some who had only school-based exposure. Educationally, most instructors held at least a bachelor's degree. One of the most notable findings was that a meaningful portion of instructors had limited real-world maintenance exposure despite years of teaching experience.

Descriptively, the sample showed:

- Mean industry experience: 253.54 months.
- Median industry experience: 216 months.
- Mean student pass rate: 0.95.
- Standard deviation of pass rate: 0.07.

A significant experience gap was also evident:

- 12% of instructors reported one year or less of industry experience.
- 45% had never performed an annual inspection in a professional environment.

- Some specifically qualified instructors had not performed the very tasks they were teaching on airworthy aircraft.

Implications

These findings support several practical recommendations. First, the FAA should consider a standardized AMT instructor endorsement or certificate aligned with the same rigor expected in pilot training. Second, an IA or a comparable maintenance credential could serve as a baseline requirement for AMT instructors. Third, Part 147 schools should evaluate instructors not only on pass rates but also on demonstrated RTS judgment, practical experience, and competency in human factors instruction (FAA, 2022, 2024; Johnson & Wheeler, 2025; Yother et al., 2025). The true measure of an instructor's success could be how many of the trained students pass the FAA exam the first time when taught by a specific instructor with practical experience.

The broader policy implication is that pass rates alone are not a sufficient proxy for instructional quality. A school can produce high pass rates while still graduating students who have not been taught by instructors with enough operational context to model safe maintenance thinking. In aviation, where small errors can have catastrophic consequences, that distinction matters (Cheng, 2018; Rashid et al., 2014; Olaganathan, 2024).

Discussion

The absence of a statistically significant relationship for Pearson's correlation is likely due in part to the restricted range of the dependent variable. When almost all students pass, it becomes difficult to detect meaningful differences in pass rates, even if instructor experience matters in other ways; pass rate ceases to be a sensitive measure of instructional quality. This finding is consistent with prior work showing that educational outcomes can be compressed by institutional policies, retesting practices, and standardization effects can mask instructor effects in educational data (Arreola & Wilson, 2020; Summey et al., 2004). The statistically significant relationship between instructors who possessed the IA endorsement and those who did not can be understood as an instructor's quality or expertise matters more than their longevity. The data suggest that holding an advanced credential, such as an IA, is a strong indicator of an effective educator, rather than just having many years of general work experience.

The descriptive pattern and endorsement relationships are more revealing than the correlation. Instructors with more experience or stronger maintenance credentials often had slightly lower pass rates. That pattern supports the idea that real-world experience, especially when the AMT possesses a higher level of maintenance endorsement, produces a more exacting RTS mindset. In contrast, instructors with less practical experience may be more likely to emphasize procedural recall and test performance over operational judgment. Less experienced instructors may be more likely to "teach to the test," or only teach what was gleaned from a training environment, as some may not possess any other contextual or overarching maintenance knowledge to bolster content learned verbatim, which can raise pass rates without necessarily strengthening operational judgment. That interpretation aligns with human factors and safety culture research showing that experienced practitioners often recognize hazards that novices miss (Adjekum & Tous, 2020; Bainbridge, 1983; Goh & Wiegmann, 2002; Johnson, 2023; Johnson, 2025; Johnson & Wheeler, 2025).

The results also reinforce the importance of safety culture and human factors in maintenance training. Aviation maintenance education should not merely transmit content; it should cultivate judgment, risk awareness, and safe habits from the outset (Adjekum & Tous, 2020; Cheng, 2018; Johnson, 2023, 2024, 2025; Johnson & Wheeler, 2025). The more interesting result is the paradox of experience. Instructors with advanced maintenance credentials may grade more strictly because their real-world experience makes them more attuned to safety margins, documentation quality, and RTS responsibilities. Thus, the more experienced instructor outcomes presented as lower pass rates.

Qualitative comments from participants also reveal a cultural divide between career mechanics and pilot-mechanic instructors. Career mechanics tend to view field experience as non-negotiable for safety-critical teaching, while some leadership-oriented instructors argue that teaching skill alone is sufficient. The pilot or pilot-mechanic theme identified encompassed a concept of "if an individual could read a manual, the individual could figure it out and teach as an AMT instructor" (Pilot, personal communication, March, 2025). This same rationale would also imply that if an individual could read a flight manual, then the same individual could figure out how to fly an airplane; one can easily see the fallacy in this thought process. The present findings do not prove one side correct, but they do suggest that technical depth and pedagogical skill should be treated as complementary rather than interchangeable (Johnson, 2025). The study provides evidence that supports the perception that there is a measurable difference in AMT instructors with and without "experience" quantified in a number of different ways. Within the context of the current study, this difference was quantified most notably in additional AMT endorsements, the IA and DME, and aligned with common practices similar to the CFI endorsement for pilots.

Limitations

This study was limited by self-reported data, recall error in estimating months of experience, and the absence of a national grading benchmark. The sample also showed substantial attrition, which may have reduced statistical power. In addition, pass rates may not fully capture the quality of instruction or the long-term competence of graduates. These limitations are important because they suggest the possibility of a hidden effect that the current measure could not detect.

Recommendations

Future research should examine whether instructor experience predicts downstream field performance rather than just school pass rates. Additional studies should compare PTS- and ACS-based outcomes, evaluate assignment alignment between instructor expertise and the courses they teach, and examine the effects of teaching at one's alma mater versus in a different training environment. Research should also test whether adopting an AMT instructor endorsement or requiring IA for instructors improves safety outcomes, instructional consistency, and first-time pass rate of students on FAA exams (FAA, 2022, 2024; Johnson, 2025; Johnson & Wheeler, 2025; Yother et al., 2025).

Conclusion

The data did not support a significant linear relationship between AMT instructor experience and student pass rates, but the broader pattern suggests a meaningful policy issue. The findings support stronger instructor standards in Part 147 and suggest that aviation maintenance education would benefit from requirements that better reflect real-world airworthiness responsibilities. This study found no statistically significant linear relationship between AMT instructor experience and student pass rates in Part 147 programs, but the descriptive evidence points to a deeper structural issue. The study found a statistically significant result for group membership for those who possessed an IA endorsement, and those who did not. Many instructors had limited real-world maintenance experience, and some were teaching without having performed the tasks they assessed on airworthy aircraft. An AMT instructor is not exercising the privileges of their certificate while instructing within a 14 CFR Part 147 maintenance training school (FAA, 2022). If the FAA does not allow the instructor to quantify 14 CFR Part 147 instructor time as "time building for experience," then the FAA clearly does not expect any entity to consider seat time as "experience." Therefore, the stance of the FAA is clear as to what the intent and interpretation of the regulations should be. Instructor time and time as a student cannot and should not be counted toward time building or considered "experience" in any instance. Given the identified loopholes in current policy and the identified exploitation of the regulations (based on the findings of this study), the loopholes must be closed. The FAA must make a clear decision and codify the regulation in law to prevent any further misinterpretation and intentional misapplication of current policy and regulations. The evidence supports the view that Part 147 would benefit from clearer instructor standards that align maintenance education more closely with safety-critical practice and the Law of Primacy and preparing students for industry operational readiness (Jones, 2021; Olcott, 2022; FAA, 2022, 2024; Johnson, 2025). The future of aviation depends on the quality of its aviation maintenance workforce, making the effective preparation of the next generation of AMTs not only an educational priority but a strategic imperative for sustaining safety, reliability, and continued industry advancement.

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Appendix A

Table 1
Descriptive Statistics for Pass Rate by AMT Training Type

	N	Range	Minimum	Maximum	Mean	Std. Deviation
Military training	9	.08	.92	1.00	.96	.033
Civilian training	39	.20	.80	1.00	.95	.049
Both	18	.17	.84	1.00	.95	.042

Note: pass rate in decimal form.

Table 2
Descriptive Statistics for Pass Rate by Method of Acquiring A&P

	N	Range	Minimum	Maximum	Mean	Std. Deviation
Military experience	7	.06	.94	1.00	.97	.031
Civilian training	46	.20	.80	1.00	.95	.049
Both	13	.08	.92	1.00	.97	.029

Note: pass rate in decimal form.

Table 3
Descriptive Statistics for Pass Rate by Teaching Location

	N	Range	Minimum	Maximum	Mean	Std. Deviation
Teaching where training was received	26	.20	.80	1.00	.95	.047
Not teaching where training was received	40	.17	.84	1.00	.96	.044

Note: pass rate in decimal form.

Table 4
Descriptive Statistics for Pass Rate by Maintenance Exposure

	N	Range	Minimum	Maximum	Mean	Std. Deviation
14 CFR Part 147 training environment is the only exposure to ACFT MX	5	.05	.92	.97	.94	.022
14 CFR Part 147 training environment is not the only exposure to ACFT MX	61	.20	.80	1.00	.96	.046

Note: pass rate in decimal form.

Table 5
Descriptive Statistics for Pass Rate by Qualification in ACS Element

	N	Range	Minimum	Maximum	Mean	Std. Deviation
Qualified in ACS	62	.20	.80	1.00	.95	.046
Not qualified in ACS	4	.03	.94	.97	.95	.012

Note: pass rate in decimal form.

Table 6
Descriptive Statistics for Pass Rate by Real-World Maintenance Experience

	N	Range	Minimum	Maximum	Mean	Std. Deviation
Real-world MX Exp on airworthy ACFT	52	.20	.80	1.00	.95	.046
No real-world MX Exp on airworthy ACFT	14	.14	.86	1.00	.97	.041

Note: pass rate in decimal form.

Table 7
Descriptive Statistics for Pass Rate by Work Signed off by A&P

	N	Range	Minimum	Maximum	Mean	Std. Deviation
Real-world MX Exp signing off work under their own A&P license	49	.20	.80	1.00	.96	.048
No real-world MX Exp signing off work under their own A&P license	16	.14	.86	1.00	.95	.037

Note: pass rate in decimal form.

Table 8
Descriptive Statistics for Pass Rate by Work Signed off Under Employer

	N	Range	Minimum	Maximum	Mean	Std. Deviation
Real-world MX Exp signing off work under employer's certificate	48	.20	.80	1.00	.95	.048
No real-world MX Exp signing off work under their employer's certificate	18	.09	.91	1.00	.96	.035

Note: pass rate in decimal form.

Table 9
Descriptive Statistics for Pass Rate by IA Endorsement

	N	Range	Minimum	Maximum	Mean	Std. Deviation
Instructor possesses an IA endorsement	22	.20	.80	1.00	.94	.053
Instructor does not possess an IA endorsement	44	.17	.84	1.00	.96	.038

Note: pass rate in decimal form.

Table 10
Descriptive Statistics for Pass Rate by DME Endorsement

	N	Range	Minimum	Maximum	Mean	Std. Deviation
Instructor possesses a DME endorsement	11	.20	.80	1.00	.93	.063
Instructor does not possess a DME endorsement	54	.17	.84	1.00	.96	.039

Note: pass rate in decimal form.

Table 11
Descriptive Statistics for Pass Rate by CFI Endorsement

	N	Range	Minimum	Maximum	Mean	Std. Deviation
Instructor possesses a CFI endorsement	5	.07	.90	.97	.94	.029
Instructor does not possess a CFI endorsement	60	.20	.80	1.00	.96	.046

Note: pass rate in decimal form.

Table 12
Descriptive Statistics for Pass Rate by CFII Endorsement

	N	Range	Minimum	Maximum	Mean	Std. Deviation
Instructor possesses a CFII endorsement	3	.08	.90	.98	.94	.042
Instructor does not possess a CFII endorsement	62	.20	.80	1.00	.95	.046

Note: pass rate in decimal form.

Table 13
Descriptive Statistics for Pass Rate by Annual Inspection Experience

	N	Range	Minimum	Maximum	Mean	Std. Deviation
Real-world MX Exp with annual inspections on airworthy ACFT	35	.20	.80	1.00	.95	.049
No real-world MX Exp with annual inspections on airworthy ACFT	29	.14	.86	1.00	.96	.036

Note: pass rate in decimal form.

Table 14
Descriptive Statistics for Pass Rate by Major Alteration Experience

	N	Range	Minimum	Maximum	Mean	Std. Deviation
Real-world MX Exp with major alterations on airworthy ACFT	50	.20	.80	1.00	.95	.047
No real-world MX Exp with major alterations on airworthy ACFT	16	.12	.88	1.00	.97	.033

Note: pass rate in decimal form.

Table 15
Descriptive Statistics for Pass Rate by Familiarity with ACS Course

	N	Range	Minimum	Maximum	Mean	Std. Deviation
Instructor has previously taught the assigned ACS course	63	.20	.80	1.00	.95	.045
Instructor has not previously taught the assigned ACS course	3	.09	.91	1.00	.96	.052

Note: pass rate in decimal form.

Table 16
Descriptive Statistics for Pass Rate by ACS Experience Alignment

	N	Range	Minimum	Maximum	Mean	Std. Deviation
Instructor experience aligns with ACS course teaching assignment	61	.20	.80	1.00	.95	.046
Instructor experience does not align with ACS course teaching assignment	1	.00	.94	.94	.94	.

Note: pass rate in decimal form

Appendix B

Questionnaire

The purpose of this study is to examine the relationship between the years of experience operating as an aviation maintenance technician (AMT) before becoming a 14 Code of Federal Regulations (CFR) Part 147 AMT instructor and the instructor pass rates for Airmen Certification Standards (ACS) element subject areas.

Before taking the questionnaire, you need to understand the following:
1. Your responses will be treated as strictly confidential and accessible only by the researcher and the need-to-know personnel.
2. Your responses will remain completely confidential and will be deidentified before analysis.
3. No reference will be made in oral or written reports that could connect you to this study, and schools will be referred to generically (e.g., Southwest, Southeast, Northeast, Pacific North-West, and Midwest, and Certificate Institutions).
4. Your participation is completely voluntary.
5. If you begin taking the survey and opt not to continue, you may simply stop.
6. Once the project is completed, the data will not be used for secondary research.

By proceeding, you are indicating that you are at least 18 years old and have agreed to voluntarily participate.

Yes No [takes them to the thank you message]

By proceeding, you are indicating that you are an AMT Instructor, who taught at a 14 CFR Part 147 maintenance school during the 2024 calendar year (January 1, 2024 – December 31, 2024) for at least one semester/term.

Yes No [takes them to the thank you message]

SECTION A: *INSTRUCTOR EXPERIENCE QUESTIONS*

The following statements are designed to measure specific aspects of what is commonly referred to as aviation maintenance experience and expertise. The statements must be interpreted according to *your profession and experience*. As such, open, honest, and candid responses are essential in accurately obtaining this information, and therefore, you should interpret them considering the way the questionnaire frames "experience." Please complete this survey in a location where you feel most comfortable and safe to answer both open and honestly.

Please read each statement carefully, then select the response that most closely corresponds to how the statements best describe your experience.

1. The definition of AMT instructor experience is the number of years operating as an Airframe and Powerplant (A&P) rated AMT mechanic within the aviation

industry, either military or civilian, as applicable, performing inspections, removal, replacement, and returning-to-service actively registered, airworthy aircraft. How many years of experience do you have within the aviation industry (Please indicate the number of months)?
(Numerical input)

______

2. How many years of experience do you have within the 14 CFR Part 147 training environment (Please indicate the number of months)?
   (Numerical input)

   ______

3. Do you hold an A&P certificate?
   (Categorical input)
   ❑ Yes ❑ No

4. Do you hold an Airframe rating for your A&P certificate?
   (Categorical input)
   ❑ Yes ❑ No

5. Do you hold a Powerplant rating for your A&P certificate?
   (Categorical input)
   ❑ Yes ❑ No

6. How did you receive Aviation Maintenance Technician (AMT) training?
   (Categorical input)
   ❑ Military ❑ Civilian (14 CFR Part 147, MRO, Repair Station, etc.) ❑ Both

7. How did you obtain your A&P certificate?
   (Categorical input)
   ❑ Military ❑ Civilian (14 CFR Part 147, MRO, Repair Station, etc.) (Training)
   ❑ Both (Prior military and license obtained through 8610-2 through previously military experience and also attended a 14 CFR Part 147 School)

8. Are you currently teaching at the 14 CFR Part 147 maintenance school where you received your training?
   (Categorical input)
   ❑ Yes ❑ No

9. Is the only exposure to the aviation industry that of the 14 CFR Part 147 maintenance school from which you received your training?
   (Categorical input)
   ❑ Yes ❑ No

10. Are you qualified in the area of expertise you teach (i.e., the ACS element subject area)?
(Categorical input)
❑ Yes ❑ No

11. Have you previously and/or currently perform the maintenance tasks you are currently evaluating on airworthy, certificated aircraft outside of the training environment?
(Categorical input)
❑ Yes ❑ No

12. Have you returned airworthy, certificated aircraft to service under your own A&P certificate number?
(Categorical input)
❑ Yes ❑ No

13. Have you returned airworthy, certificated aircraft to service under your employer's license/certificate number (for example, a Maintenance, Repair, and Overhaul (MRO) facility?
(Categorical input)
❑ Yes ❑ No

14. Regarding question thirteen, if so, is this the only type of return-to-service maintenance work you have performed?
(Categorical input)
❑ Yes ❑ No

15. Do you currently hold an Inspection Authorization (I.A.) endorsement?
(Categorical input)
❑ Yes ❑ No

16. Regarding question fifteen, how long have you held an I.A. endorsement (Please indicate the number of months)?
(Numerical input)
______

17. Do you currently hold a Designated Mechanic Examiner (D.M.E.) endorsement?
(Categorical input)
❑ Yes ❑ No

18. Regarding question seventeen, how long have you held a D.M.E. endorsement (Please indicate number of months)?
(Numerical input)
______

19. Regarding question seventeen, how many Federal Aviation Administration (FAA) Oral and Practical (O&P) exams have you administered within the last year (initial rating, added rating, and retest) (Please indicate the total number of exams)?
(Numerical input)

______

20. Do you currently hold a Certified Flight Instructor (C.F.I.) endorsement?
(Categorical input)
❑ Yes ❑ No

21. Regarding question 20, how long have you held a C.F.I. endorsement (Please indicate number of months)?
(Numerical input)

______

22. Do you currently hold a Certified Flight Instructor Instrument (C.F.I.I.) endorsement?
(Categorical input)
❑ Yes ❑ No

23. Regarding question 22, how long have you held a C.F.I.I. endorsement (Please indicate number of months)?
(Numerical input)

______

24. Have you performed an Annual Inspection on an airworthy, certified aircraft outside the training environment?
(Categorical input)
❑ Yes ❑ No

25. Regarding question 24, how many Annual Inspections on airworthy certificated aircraft have you performed (Please indicate the number)?
(Numerical input)

______

26. Have you performed a Major Repair or Major Alteration on an Airworthy, Certificated Aircraft?
(Categorical input)
❑ Yes ❑ No

27. Regarding question 26, how many Major Repairs or Major Alterations on airworthy, certificated aircraft have you performed (Please indicate the number)?
(Numerical input)

______

Section B: ***ACS Element Subject Area Level Pass Rates***

The following questions are designed to measure the pass rates of the appropriate ACS element subject areas, the course taught by the instructor. Certain aspects of what is commonly called currency within the framework of higher education and job qualifications will be quantified. As noted, the statements must be interpreted relative to your personal and professional experience. As such, open, honest, and candid responses are key in accurately obtaining this information, and therefore, you should interpret them in light of the way the questionnaire frames "experience." Please read each statement carefully, then select the response that most closely corresponds to the specific ACS element subject areas taught. The following questions pertain to courses and pass rates ***over the last year, from January 1, 2024, to December 31, 2024.***

For multiple course assignments, please assess each input for the specific course selected, and repeat as necessary. For the below questions, ***please consider your top two most frequently taught subject areas over the course of the past year.*** Concerning courses which were taught either multiple times or for multiple sections, please include all corresponding information for each iteration of the course taught, and for those multiple iterations, the total number of entries will be considered as a single course taught. For example, if you taught the subject area of Propellers for five separate sections, Hydraulics three times, and Sheetmetal twice, over the course of the last year, your top two most taught courses would be Propellers, and Hydraulics but you would have seven entries pertaining to the dropdown menu, one set of questions pertaining to each iteration of a course. A dropdown menu will populate accordingly.

*** Please note, due to limitations in Survey capabilities, if multiple sections are taught, as discussed above, please have information before attempting survey input. ***

28. What curriculum does the ACS element subject area in which one of your most taught classes reside, (General, Airframe, Powerplant)
(Drop-down input)

General
❏ Fundamentals of Electricity ❏ Aircraft Drawing ❏ Weight and Balance ❏ Fluid Lines and Fittings ❏ Aircraft Materials ❏ Ground Operations
❏ Cleaning and Corrosion ❏ Mathematics ❏ Regulations and Maintenance Forms
❏ Physics for Aviation ❏ Inspection Concepts ❏ Human Factors

Airframe
❏ Metallic Structures ❏ Non-Metallic Structures ❏ Flight Controls
❏ Airframe Inspection ❏ Landing Gear Systems
❏ Hydraulics and Pneumatics ❏ Environmental Systems
❏ Aircraft Instruments ❏ Comm/Nav Systems ❏ Aircraft Fuel Systems
❏ Aircraft Electrical ❏ Ice and Rain Control Systems

❏ Fire Control Systems ❏ Rotorcraft Fundamentals
❏ Water and Waste Systems

Powerplant
❏ Reciprocating Engines ❏ Turbine Engines ❏ Engine Inspection
❏ Engine Instrument Systems ❏ Fire Protection Systems
❏ Engine Electrical Systems ❏ Lubrication Systems
❏ Ignition and Starting Systems ❏ Engine Fuel/ Fuel Metering
❏ Recip Induction and Cooling Systems ❏ Turbine Engine Air Systems
❏ Engine Exhaust/ Reverser Systems ❏ Propellers

29. Have you taught this course before?
(Categorical input)
❏ Yes ❏ No

30. Regarding question twenty-nine, please indicate how many times you have previously taught this course.
(Numerical input)
______

31. Regarding question twenty-nine, does your industry experience (if any) align with the course material you are teaching? (If you lack industry experience as defined by the questionnaire, please select N/A)
(Categorical input)
❏ Yes ❏ No ❏ N/A

32. How many of the current students were retaking this course, or had failed or dropped out previously? In otherwards, the most recent iteration was not the student's first exposure to the content contained within the subject area?
(Numerical input)
______

33. How many students were in the selected course (including retake students)?
(Numerical input)
______

34. Regarding question thirty-three, please indicate the number of students within each category of grade range.
(Categorical input and Numeric input)
❏ <59 ______
❏ 60–65 ______
❏ 66–69 ______
❏ 70–75 ______
❏ 75–79 ______

❑ 80–85 _____
❑ 86–89 _____
❑ 90–95 _____
❑ 96–100 _____

35. Regarding question thirty-two of the total number of students assigned to the course, how many passed (i.e., obtained a course grade of 70% or above)? (Numerical input)

_____

Section C: *Demographics*
Please provide the following information:

36. What is your name?
(Please note this is simply for instructor allocation to appropriate schools for a matched of information prior to deidentification. Again, strict confidentiality will be maintained and then be completely scrubbed).

____

37. What is your age?
❑18–19 ❑ 20–29 ❑ 30–39 ❑ 40–49 ❑ 50–59 ❑ 60 or older

38. What is the highest level of education you have completed or the highest degree you have received?
❑ Some schooling
❑ High school degree or equivalent (e.g., GED or diploma)
❑ Completed some college but no college degree
❑ Associate degree or 2-year equivalent
❑ Bachelor's degree or 4-year equivalent (BS or BA)
❑ Graduate degree (master’s or doctoral)
❑ Other (please describe)

____

39. Please enter the school for which you teach.
(Please note this is simply for instructor allocation to appropriate schools for a matched of information prior to deidentification. Again, strict confidentiality will be maintained and then be completely scrubbed).
❑ Aviation Institute of Maintenance (AIM)
❑ Liberty University (LU)
❑ Pittsburgh Institute of Aeronautics (PIA)
❑ Portland Community College (PCC)
❑ Southern Illinois University Carbondale (SIU)
❑ Other (please describe)

____

40. What is your gender?
    ❏ Male ❏ Female ❏ Prefer not to say

41. Please enter your race/ethnicity (optional) check all that apply.
    ❏ White

    ❏ Black or African American

    ❏ Hispanic, Latino, or Spanish

    ❏ American Indian or Alaska Native

    ❏ Asian origin

    ❏ Native Hawaiian or Other Pacific Islander

    ❏ Other

    ❏ Prefer not to say

Survey ending message:

Your response has been submitted. Thank you for your participation! It is greatly appreciated.