

GENERATION Z TRAITS AND AVIATION INDUSTRY RIGIDITY: IMPACT ON CADET'S MENTAL RESILIENCE

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Abstract: The aviation industry demands strict procedural compliance, hierarchical structure, and rigorous discipline, while Generation Z tends to be digitally oriented, flexible, and less tolerant of rigidity. This study examines how Generation Z cadets navigate their personal characteristics within a rigid aviation training environment and the resulting impact on the mental resilience of prospective aviation professionals. A sequential explanatory mixed-methods design was used. In the quantitative phase, 92 of 120 cadets were selected through proportionate stratified random sampling and analyzed using multiple regression and mediation analysis; in the qualitative phase, 12 informants were purposively selected based on resilience-score variation. Results show that Generation Z characteristics and perceived industry rigidity significantly and negatively predict mental resilience, with a significant interaction effect; self-efficacy partially mediates this relationship, and resilience increases across semesters. Qualitative findings reveal friction, coping strategies, and gradual character transformation.

Keywords: Aviation Education, Generation Z, Mental Resilience, Rigidity, Self-Efficacy

Introduction

The aviation industry is characterized by an exceptionally high level of rigidity, since every action and decision within it is directly tied to the safety of passengers and crew. As an ultra-safe, high-risk industry, commercial aviation records fewer than one fatal accident per ten million occurrences, reflecting the stringency of the operational standards that all personnel must observe (Brugnara et al., 2022). This rigidity is expressed through strict procedural compliance, clearly defined hierarchical structures, and non-negotiable professional-competency requirements. In such conditions, discipline is a critical foundation, because even a minor lapse can have major implications for flight safety (Fatonah, 2023).

The rapid growth of the aviation industry, marked by rising passenger and airline numbers, has increased the need for human resources that are professional, reliable, and resilient (Putra et al., 2023). Aviation personnel must possess not only technical skills but also the psychological readiness to withstand high operational pressure and rapidly changing conditions (Miao et al., 2024; Qiu et al., 2023). Human factors remain a leading source of unsafe events in air transport, making crew decision-making and competence critical (Lin et al., 2025). Character-building and mental preparedness during the education phase are therefore indispensable in preparing prospective aviation personnel (Handoko et al., 2022; Putra et al., 2023).

Generation Z, who now populate aviation education and training programs, bring characteristics that differ markedly from earlier generations. Having grown up in a digital ecosystem, they are accustomed to rapid information flow and hold distinctive expectations of both learning and working environments. Tension arises when these traits meet an aviation world that demands procedural compliance, high discipline, and the capacity to work under pressure (Brugnara et al., 2022; Fatonah, 2023). Research at the Curug Indonesia Aviation Polytechnic found that cadet attitude and discipline formation requires particular attention, and that leadership style in character development positively affects cadet attitudes and discipline (Fatonah, 2023), underscoring the need for a deliberate approach to managing Generation Z characteristics within a rigid aviation-education setting.

Mental resilience is a critical variable in this context. Research indicates that resilience can be cultivated through appropriate training programs and adequate environmental support (Kho et al., 2022; Navickienė & Vasiliauskas, 2024). In military and aviation settings, cadet resilience is closely linked to self-efficacy and professional achievement, with self-efficacy acting as an important mediator (Navickienė & Vasiliauskas, 2024). Studies of military pilots similarly show that higher self-efficacy is associated with greater resilience in handling special flight situations (Qiu et al., 2023). Furthermore, the psychological well-being of aviation personnel affects not only performance but also overall flight safety (Miao et al., 2024).

Highly demanding aviation education environments require cadets to display discipline, engagement, and endurance. Cadets must comply with a strict code of conduct and adapt to firm hierarchical structures, often blurring the boundary between personal and professional life (Navas-Jiménez et al., 2024). Such conditions can generate psychological pressure, including anxiety, frustration, and diminished self-regulation among some cadets (Soroka et al., 2021). Research on civil-aviation cadets similarly found that, although self-awareness and self-acceptance generally fall within normal ranges, moderate and even severe symptoms occur on some dimensions, particularly academic self-awareness (Miao et al., 2024).

Structured character education is a key foundation for prospective aviation personnel. Basic character-building programs for transportation cadets aim to cultivate discipline and skill while emphasizing religious values, responsibility, independence, hard work, and national spirit (Putra et al., 2023), yet implementation still faces obstacles such as low cadet awareness, pre-existing habits, and limited family oversight (Putra et al., 2023). The link-and-match model in aviation education likewise stresses the importance of policy innovation in producing reliable, resilient human resources (Handoko et al., 2022). From a safety perspective, gaps remain in civil-pilot training, particularly limited practical risk exposure for young cadets (Brugnara et al., 2022), while pilot personality itself evolves from cadet to captain toward traits more aligned with flight-safety demands (Zhu & Chen, 2024).

Although resilience has been widely studied in military and aviation contexts, few studies specifically address how Generation Z characteristics interact with aviation-industry rigidity, and how that interaction affects the mental resilience of prospective professionals; most prior work instead focuses on mental-state change after specific incidents rather than the psychological factors shaping readiness from the education phase onward (Qiu et al., 2023). Supervisor-led resilience training has also proven more effective than self-directed training in improving cadets' psychological outcomes from an early stage (Kho et al., 2022), reinforcing the need for a more comprehensive and contextual approach. Building on this background, this article analyzes how Generation Z characteristics adapt within a rigid aviation-industry environment and examines the resulting impact on the mental resilience of prospective aviation professionals, contributing both

theoretically to aviation-education psychology and practically to the design of training programs that are adaptive to new generational characteristics without compromising the safety and professionalism that underpin the aviation industry.

Method

This study used a mixed-methods approach with a sequential explanatory design, in which a quantitative phase was conducted first to obtain a general picture, followed by a qualitative phase to deepen and explain the findings.

The population comprised all active Generation Z cadets enrolled in semi-military aviation education in Indonesia ($N = 120$). In the quantitative phase, 92 respondents were selected using proportionate stratified random sampling based on semester level, with sample size determined via the Slovin formula at a 5% margin of error. In the qualitative phase, 10–15 informants were purposively selected based on variation in resilience scores (high, moderate, low) to capture a deeper understanding of cadets' adaptation experiences.

The quantitative instrument was a closed questionnaire measuring three constructs — Generation Z characteristics, perceived rigidity of the aviation education environment, and mental resilience — using a 1–5 Likert scale, with validity and reliability tested prior to use. The qualitative instrument was a semi-structured interview guide developed from the quantitative findings, used to explore cadets' experiences of discipline demands, academic pressure, and the process of building mental resilience.

Quantitative data were analyzed using multiple regression and mediation analysis to test the effects of Generation Z characteristics and perceived environmental rigidity on mental resilience. Qualitative data were analyzed thematically through data reduction, data display, and conclusion drawing to identify core themes explaining how cadets navigate their characteristics within a disciplined, structured aviation education environment. Quantitative and qualitative results were integrated at the interpretation stage, with qualitative findings used to explain statistical results and enrich understanding of the interaction between Generation Z characteristics and aviation-education rigidity.

Discussion

Respondent Characteristics.

Of the 92 Generation Z cadet respondents, the semester-level distribution was proportionate: Semester II (26.1%), Semester IV (28.3%), and Semester VI (45.6%). All respondents were aged 18–27, consistent with the Generation Z birth-year range (1995–2010). The sample was predominantly male (78.3%) compared with female (21.7%), reflecting the general cadet composition at Indonesian semi-military aviation institutions.

Generation Z Characteristics.

Descriptive analysis showed that cadets scored highly on digital-technology familiarity ($M = 4.21$, $SD = 0.58$) and need for flexibility ($M = 3.89$, $SD = 0.72$), whereas tolerance for rigid hierarchy ($M = 2.67$, $SD = 0.81$) and patience with gradual processes ($M = 2.84$, $SD = 0.76$) were comparatively low (Table 1; Figure 1). These findings align with descriptions of Generation Z as the physically safest yet mentally most fragile generation, whose overall resilience appears lower than that of previous generations (Boyden et al., 2024). Overall, the Generation Z characteristics variable fell in the high category ($M = 3.51$, $SD = 0.63$), indicating a pronounced generational profile that may conflict with the demands of semi-military aviation education.

Table 1. Descriptive Statistics of Generation Z Characteristics (n = 92)

Dimension	Mean	SD	Category
Digital technology familiarity	4.21	0.58	Very High
Need for flexibility	3.89	0.72	High
Work-life balance orientation	3.76	0.69	High
Socio-emotional needs	3.68	0.74	High
Tolerance for rigid hierarchy	2.67	0.81	Moderate
Patience with gradual processes	2.84	0.76	Moderate

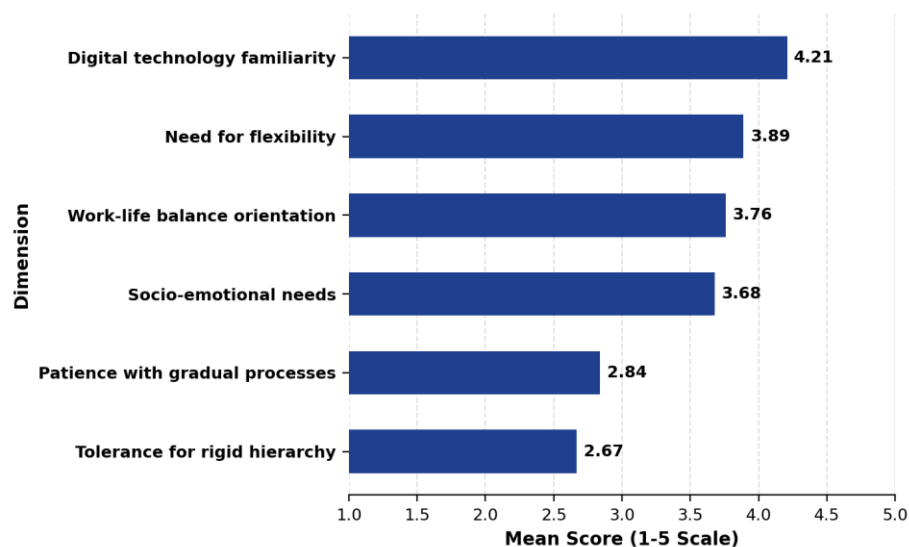


Figure 1. Comparison of Generation Z Characteristic Dimension Scores

Perceived Rigidity of the Aviation Industry.

Cadets perceived the aviation education environment as highly rigid overall ($M = 4.18$, $SD = 0.54$), with procedural compliance ($M = 4.42$) and hierarchical structure ($M = 4.23$) rated “very high,” and discipline demands ($M = 4.15$) and strict competency standards ($M = 3.94$) rated “high” (Table 2; Figure 2). These results confirm that cadets are fully aware of the rigidity of their training environment, in which they are expected to strictly observe a code of conduct and assimilate into a well-defined hierarchy — consistent with aviation's status as an ultra-safe, high-risk sector.

Table 2. Descriptive Statistics of Perceived Aviation Industry Rigidity (n = 92)

Dimension	Mean	SD	Category
Procedural compliance	4.42	0.49	Very High
Hierarchical structure	4.23	0.57	Very High
Discipline demands	4.15	0.61	High

Strict competency standards	3.94	0.66	High
Overall mean	4.18	0.54	Very High

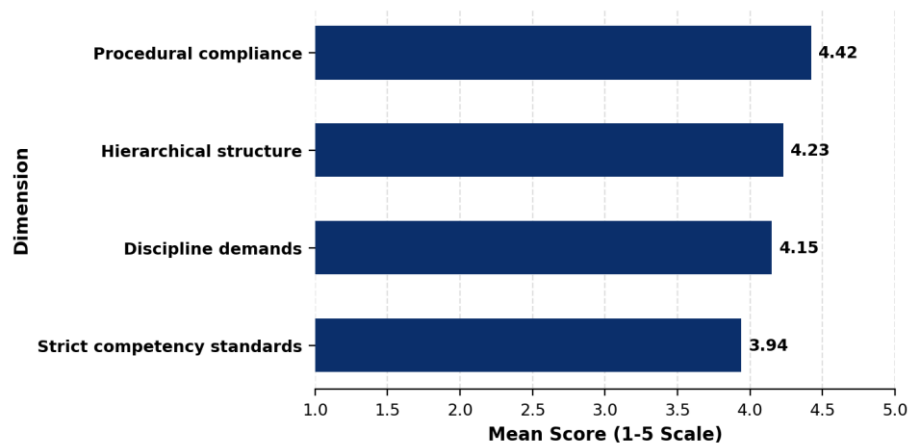


Figure 2. Comparison of Perceived Aviation Industry Rigidity Dimension Scores

Mental Resilience.

Overall mental resilience fell in the moderate category ($M = 3.24$, $SD = 0.71$): 23.9% of cadets scored high, 52.2% moderate, and 23.9% low (Table 3). Per-dimension analysis showed emotion regulation as the lowest-scoring dimension ($M = 2.89$, $SD = 0.83$) and social support as the highest ($M = 3.56$, $SD = 0.68$) (Table 4; Figure 3). This pattern is consistent with findings that flight cadets show moderate psychological symptoms across several factors, with severe symptoms specifically in academic self-awareness (Miao et al., 2024); the low emotion-regulation score likewise aligns with evidence that Generation Z faces significant psychological pressure, including anxiety and frustration, in demanding training environments (Soroka et al., 2021; Han et al., 2024).

Table 3. Distribution of Cadet Mental Resilience Categories ($n = 92$)

Category	Score Range	Frequency	Percentage
High	> 3.67	22	23.9%
Moderate	2.34 – 3.67	48	52.2%
Low	< 2.34	22	23.9%

Table 4. Descriptive Statistics of Mental Resilience Dimensions ($n = 92$)

Dimension	Mean	SD	Category
Emotion regulation	2.89	0.83	Moderate
Impulse control	3.04	0.79	Moderate
Causal analysis	3.18	0.72	Moderate
Self-efficacy	3.31	0.75	Moderate

Empathy	3.47	0.64	Moderate
Social support	3.56	0.68	High
Overall mean	3.24	0.71	Moderate

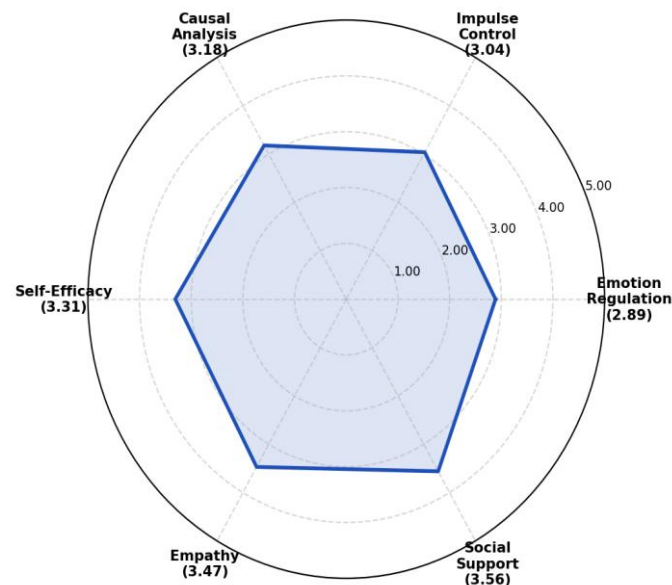


Figure 3. Radar Chart of Mental Resilience Dimension Profile

Regression and Mediation Analysis.

Multiple regression testing the effects of Generation Z characteristics (X1) and perceived industry rigidity (X2) on mental resilience (Y) yielded a significant model ($F = 15.217$, $p < .001$, Adjusted $R^2 = .319$), indicating that 31.9% of the variance in mental resilience is explained by these two predictors (Table 5). Generation Z characteristics significantly and negatively predicted resilience ($\beta = -.287$, $p = .002$), as did perceived rigidity ($\beta = -.213$, $p = .023$), and the interaction between the two variables was also significant ($\beta = -.196$, $p = .035$) — indicating that resilience declines further as strong Generation Z characteristics meet high perceived rigidity. These results are consistent with evidence that self-efficacy shapes cadets' capacity to handle special situations through resilience (Qiu et al., 2023) and that self-efficacy mediates the relationship between resilience and cadets' professional achievement (Navickienė & Vasiliauskas, 2024). The negative effect of rigidity on resilience also parallels findings that occupational stress correlates negatively with the mental health and performance of civil-aviation pilots (Zhao et al., 2023).

Table 5. Multiple Regression Results

Variable	B	β	t	Sig.
Constant	4.127	—	6.842	.000
Gen Z characteristics (X1)	-0.318	-0.287	-3.124	.002
Perceived rigidity (X2)	-0.246	-0.213	-2.318	.023
Interaction $X1 \times X2$	-0.189	-0.196	-2.147	.035

Model Statistic	Value
R	0.584
R ²	0.341
Adjusted R ²	0.319
F	15.217
Sig. F	.000

Mediation testing confirmed that self-efficacy partially mediates the relationship between Generation Z characteristics and mental resilience (indirect effect = -.112, 95% CI [-.198, -.041]; Table 6; Figure 4), affirming self-efficacy as a critical mediating mechanism, consistent with its role as a comprehensive mediator between cadet resilience and professional achievement (Navickienė & Vasiliauskas, 2024).

Table 6. Self-Efficacy Mediation Analysis Results

Path	Effect	SE	95% CI
Direct effect (X1 → Y)	-0.206	0.078	-0.361, -0.051
Indirect effect (X1 → M → Y)	-0.112	0.039	-0.198, -0.041
Total effect (X1 → Y)	-0.318	0.092	-0.501, -0.135

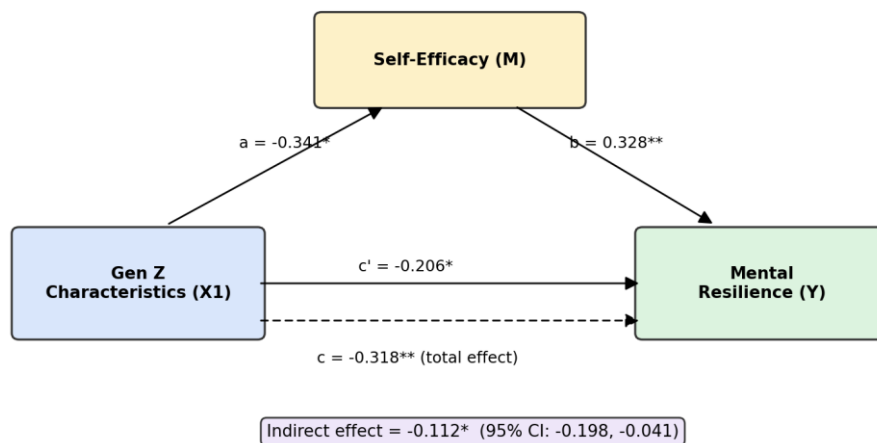


Figure 4. Path Model of Self-Efficacy Mediation Analysis

Resilience Across Semesters.

One-way ANOVA revealed a significant difference in mental resilience by semester level, $F(2, 89) = 4.873$, $p = .010$. Semester VI cadets showed higher resilience ($M = 3.48$, $SD = 0.65$) than Semester IV ($M = 3.17$, $SD = 0.69$) and Semester II ($M = 2.94$, $SD = 0.78$) cadets (Figure 5), suggesting that professional character is not formed all at once but develops gradually through the education process.

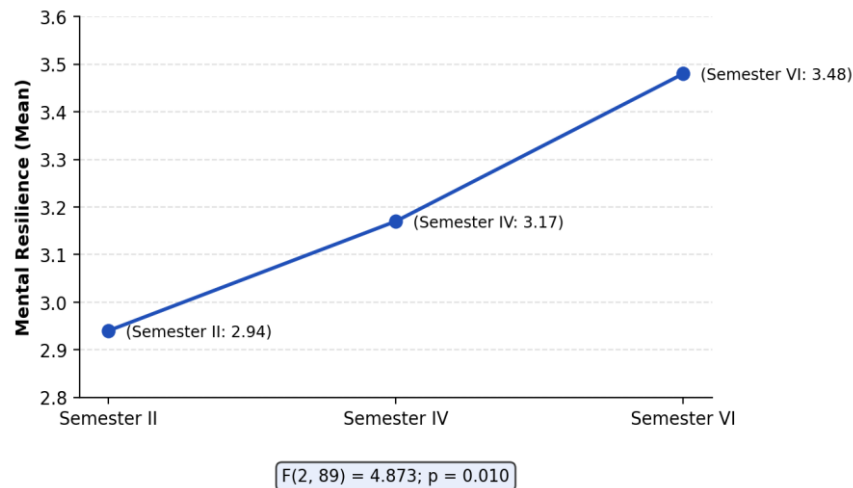


Figure 5. Increase in Mental Resilience by Semester

Qualitative Findings.

Thematic analysis of the interview data identified three core themes (Table 7): (1) friction between Generation Z characteristics and the aviation environment, encompassing tension between the need for flexibility and procedural compliance, conflict between a digital orientation and conventional-skill demands, and resistance to hierarchy and seniority culture; (2) coping and adaptation strategies, including peer support as a primary source of resilience, cognitive restructuring that reframes strict rules as part of safety and professionalism, and the role of instructor leadership in explaining the rationale behind rules; and (3) character transformation and resilience-building, reflected in the internalization of professional aviation values and growth through adversity.

Table 7. Themes and Subthemes from the Thematic Analysis

Main Theme	Subtheme	Summary Finding
Friction between Gen Z characteristics and the aviation environment	Tension between need for flexibility and procedural compliance	Cadets must adjust to schedules and rules stricter than their prior learning habits.
	Conflict between digital orientation and conventional-skill demands	Digital familiarity does not always ease training, which still requires manual skills and face-to-face communication.
	Resistance to hierarchy and seniority culture	Some cadets struggle to accept layered structures and restrictions on junior members' opinions.
Coping and adaptation strategies	Peer support as a primary source of resilience	Peers provide emotional reinforcement, shared experience, and help in facing educational pressure.
	Cognitive restructuring and reappraisal	More resilient cadets tend to reframe strict rules as part of safety and professionalism.

	Role of instructor leadership	Instructors who explain the rationale behind rules are seen as more effective in supporting adaptation.
Character transformation and resilience-building	Internalization of professional aviation values	Education pushes cadets toward greater discipline, responsibility, and emotional control.
	Growth through adversity	Pressure during education is viewed as an experience that builds resilience and inner strength.

Synthesis.

Overall, the findings show that Generation Z cadets bring characteristics well suited to digital technology and flexible working styles, but less suited to rigid hierarchy and gradual processes, creating a distance between the younger generation's character and the demands of semi-military aviation education. This pattern echoes broader evidence that Generation Z generally favors flexibility, work-life balance, and digital innovation, so traditional training models do not always align with how they learn and work (Rotich et al., 2025). Low tolerance for hierarchy is particularly consequential because aviation is built on strict procedural discipline and chain of command, in which compliance is not merely administrative but part of the safety system itself (Brugnara et al., 2022; Navas-Jiménez et al., 2024); notably, cadets with higher resilience appeared better able to distinguish rules genuinely tied to safety from those that felt merely formal.

This picture also fits the broader characterization of Generation Z as the physically safest yet mentally most vulnerable generation. The shift from a relatively comfortable environment into a demanding aviation education setting produces a pronounced transition shock, intensified by strict discipline and the need for rapid adaptation (Boyden et al., 2024; Han et al., 2024). Younger cadets typically lack the depth of experience and support networks available to older generations, so when Generation-Z-specific stressors meet a rigid environment, resilience depends heavily on cadets' ability to interpret pressure as part of growth rather than simply as a burden (Han et al., 2024).

The regression findings — showing that both Generation Z characteristics and perceived rigidity negatively predict resilience, with a significant interaction effect — explain 31.9% of the variance, indicating that other contributing factors remain to be identified. The mismatch between Generation Z's preference for flexibility, autonomy, and digital approaches and an aviation education environment that demands strict compliance and hierarchical structure generates substantial adaptation pressure, particularly for cadets unaccustomed to the rhythm of semi-military education; when rigidity is perceived as excessive, it is more often experienced as a burden than as part of professional formation, and resilience declines accordingly.

The partial mediating role of self-efficacy indicates that generational character affects resilience not only directly but also through cadets' belief in their own competence: lower self-efficacy makes cadets more prone to feelings of inadequacy when facing rigorous, highly structured demands, while those who view their competence positively adapt more readily to pressure.

The rise in resilience across semesters indicates that aviation education, while demanding, is not without effect: cadets who persist longer tend to develop stronger adjustment, moving from an early adaptation phase toward accumulated experience, routine, and more mature coping strategies as pressure that initially feels heavy becomes a source of self-strengthening.

Social support emerged as the most prominent resilience dimension, both in the quantitative results and the qualitative theme of peer support: camaraderie among cadets functions as emotional reinforcement and a space for maintaining a shared pace of adaptation. Instructor leadership is similarly decisive — instructors who explain the reasoning behind rules are more readily accepted than those who merely demand compliance, helping cadets see rules as part of safety and professionalism rather than mere restriction, making explanatory yet firm leadership an important protective factor in cadets' adaptation.

Finally, emotion regulation stands out as the most vulnerable resilience dimension, indicating that Generation Z cadets still struggle to manage pressure steadily, particularly in an environment demanding high self-control and offering limited room for expression. This points to a clear need for dedicated emotional-management training, closer mentoring, and more communicative coaching approaches, since resilience cannot be built through discipline and compliance alone but also requires the capacity to manage pressure, restrain impulses, and remain composed under difficult conditions.

Conclusion

Generation Z cadets in semi-military aviation education bring a distinctive character profile: strong familiarity with digital technology, a preference for flexibility, and a tendency to expect clearer work-life boundaries. This profile stands in contrast to an aviation education environment built on strict discipline, procedural compliance, and firm hierarchy, producing tangible friction — particularly in the early stages of training. Statistically, Generation Z characteristics and perceived aviation-industry rigidity significantly and negatively affect cadets' mental resilience, with self-efficacy serving as a partial mediator that helps some cadets convert pressure into growth. Resilience strengthens progressively across semesters, shaped by accumulated experience, peer support, and instructor leadership that explains rather than merely enforces rules. Emotion regulation remains the weakest resilience dimension, underscoring the need for psychological, not only disciplinary, support. These findings point to the importance of adaptive educational approaches that respond to Generation Z's characteristics without compromising the safety and professionalism standards fundamental to the aviation industry.

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