

[EN-0018] Human factors in general aviation flight instruction authenticity: A measure of student's perceived satisfaction

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Abstract: In flight instruction, effective communication between the instructor and student is critical in maintaining a safe training environment. While in general, leadership has been identified as a component that affects safety outcomes in aviation, the survey relates specifically of the leadership of the instructor as it applies to their student. In this quantitative study, leadership in the cockpit in the form of flight instruction authenticity is explored. The Safety Management System (SMS) model recently adopted by the Federal Aviation Administration for securing safety operation data and analysis of latent conditions for all operators in the National Airspace System (NAS). A survey instrument was developed in order to measure whether authentic leadership is positively associated with individual student pilot satisfaction. A survey instrument was administered to fifty (50) pilots on the Eastern Shore of Maryland. The results indicated high correlation ($r=.912$) between perceived instructor authenticity and satisfaction scales. Study results indicate that further investigation into how the authentic model influences aviation safety is warranted.

Keywords: Leadership, flight training, satisfaction, human factors.

1. INTRODUCTION

As a result of, what appeared to be, weekly examples of corporate corruption by organizational leaders over the past few years, interest in measures of leader authenticity have increased. Avolio, Luthans, and Walumbwa^[1] noted, “the unique stressors facing organizations throughout society today call for a new leadership approach aimed at restoring basic confidence, hope, optimism, resiliency, and meaningfulness” (p. 3). Stakeholders and subordinates have increasingly required that their leaders’ walk-the-walk and not just talk-the-talk, a discrepancy identified by Simons^[2] who stated rhetoric and intentions must coincide with behavior and action.

2. AUTHENTIC LEADERSHIP

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Authentic leadership has its roots in Bass^{[3][4]} and Bass & Steidlmeier^[5]. Bass focused on the moral and ethical components of transformational and charismatic leaders. Walumbwa, Avolio, Gardner, Wernsing and Peterson^[6] proposed that there is more to authentic leadership than “being true to oneself” (p. 90) as maintained by Taylor^[7]. Leadership authenticity was operationally defined by researchers^[5] for the purpose of creating a quantitative multi-dimensional theory-based measure of the leadership construct, the Authentic Leadership Questionnaire (ALQ).

Authenticity as a construct is defined by Harter^[8] as, “owning one’s own personal experiences, be they thoughts,

emotions, needs, preferences, or beliefs, processes captured by the injunction to know oneself” (p. 382). Luthans and Avolio^[9] defined authenticity as, “a process that draws from both positive psychological capacities and a highly developed organizational context, which results in both greater self-awareness and self-regulated positive behaviors on the part of leaders and associates, fostering positive self-development” (p. 243).

Walumbwa et al.^[6] utilized the conceptualizations of Avolio et al.^[1] and Ilies, Morgeson, and Nahrgang^[10] as a part of their definition.

Authentic leadership is concerned with positive relationships between leader and follower (May, Chan, Hodges, & Avolio)^[11]. Gardner and Schermerhorn^[12] proposed that subordinate involvement by authentic leaders increases performance. This sentiment was echoed by Yammarino, Dionne, Schriesheim and Dansereau^[13] in their study linking authentic leadership with positive organizational behavior.

Authentic leadership is grounded in positive psychology and thus looks at ones strength’s, not weaknesses. Leaders that are considered authentic are those who embody the attributes of optimism, hope, resilience, morality and transparency^[14]. Additionally, authentic leaders have others’ interest in mind and thus, value two-way communication and full participation. Transparency manifests itself as the desire to keep one exposed values in-line with their actions. Increased communication ensures that followers will feel a part of the process and only adds to the openness (transparency) of the leader. Authentic leaders demonstrate a respect for the process and are willing to invest the necessary time to collect information about a situation before rushing to judgment. In aviation safety, the worst kind of leader is one who purports to hold safety as the number one aim and goal of the organization while secretly not investing the time or resources necessary to truly measure all latent conditions present. This type of leader is operating in the blind and is unable to receive the safety sensitive information from his/her subordinates necessary to avoid critical incidents and accidents. Fry and Whittington^[14] explain that this type of leader creates a culture of distrust and alienation. Negative outcomes of decreased organizational citizenship include injuries and lost performance. They also identify the ability to change the lives of followers as a measure of authentic leadership. That is, like legacy leadership, students who found their instructors truly authentic would be more satisfied with the training and adopt their flying methods.

The Authentic Leadership Questionnaire (ALQ) developed by Walumbwa, Avolio, Gardner, Wernsing and Peterson^[6] allows leaders to assess their own perceived level of authenticity and compare it to their subordinate/s perception of their authenticity. The difference between the self-evaluation and the subordinate evaluation alone is

a valuable tool for determining one’s own self-authenticity. The ALQ measures leader transparency, awareness, ethics (morality), and balanced processing.

Walumbwa et al.^[6] conducted three studies for the purpose of testing a theory based measure for authentic leadership. The third study in the research indicated a positive relationship between authentic leadership and supervisor related performance. Limited studies exist on leadership and satisfaction in the cockpit and authenticity as a construct to be used for aviation flight instruction.

2.1 Call for leadership in aviation

Yukl^[15] indicated that there are key relations-oriented behaviors that leaders possess: supporting; developing; and recognizing. Recognizing behavior involves positive feedback on effective performance. He states that this type of recognition helps to, “strengthen desirable behavior, improve interpersonal relationships, and increase job satisfaction” (p. 69).

The Federal Aviation Administration (FAA) has recently adopted the Safety Management System (SMS) model to manage data collection for research and development in its National Airspace System (NAS). Flight operations instruction is a component of the SMS model of significant interest to flight instruction as outlined in the FAA Advisory Circular FAA AC-120-92. In section 7.1 of this document, the FAA identifies the need for leadership to establish an effective employee feedback system that provides confidentiality as is necessary in order to maintain a positive safety culture and overall training satisfaction.

The Safety Management Systems Model has its roots in the International Standards Organization (ISO) where leadership is a key element. Of its eight (8) key principles, Principle 2 focuses on leadership. The ISO^[16] states that leaders should establish, “unity of purpose and direction of the organization. They should create and maintain the internal environment in which people can become fully involved in achieving the organization’s objectives” (p.1). Some positive outcomes include organizational trust, active participation, increased communication and positive motivation, all of which contribute to perceived satisfaction within the flight training environment.

One of the models utilized to define how the SMS system works is the SHELL model (Fig. 1). In the SHELL Model^[17], there exists a relationship between two liveware components (i.e. human to human) in the aviation organization. The model recognizes that individual performance and behavior is affected by group influences. Human factors studies in crew resource management in the field of aviation have investigated the influence of cooperation and group interaction variables on the management of human errors (Flight Safety)^[18]. Flight Safety has identified leadership activities, teamwork and

personal interactions as examples of the Liveware-Liveware interface.

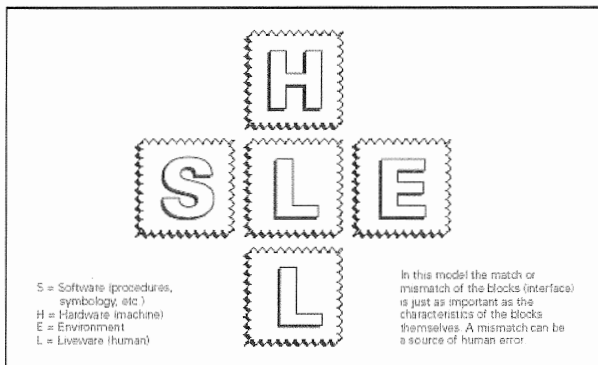


Figure 1 SHELL Model^[17]

2.2 Satisfaction and Leadership

Previous studies have identified positive relationships between leadership variables and job satisfaction (Bogler^[19]; Kim^[20]; Medley, & Larochelle^[21]; Podsakoff, MacKenszie, Moorman, & Fetter^[22]; Lok, & Crawford,^[23]). Key elements include increased communication and citizenship behavior as a result of leader/subordinate interactions. Studies specifically targeting leadership and follower satisfaction in the cockpit^[24] indicated that participative leadership strategies increased follower satisfaction.

2.3 Regulatory need for leadership

The SMS model recognizes that some latent conditions in aviation may be a result of leadership decisions, attitudes and perceptions. The first two lines of defense include the decision makers (organizational leaders) followed by line management. An example of a defense utilized by leadership is communication. Specifically, self-reporting of potential risks and/or hazards from subordinates to leadership. Leaders define human behavior, operating climate, human and cultural factors, and corporate culture. In order for a SMS system to be effective, it must have authentic commitment by the organization's leadership.

SMS requires leaders to be proactive in their system management. It is the leadership that is responsible for creating a positive culture in the organization. Policies should be credible and leadership should ensure that the organization's core values are not compromised for any reason.

Lee Cockerell^[25], formerly the Executive Vice President of Operations at the Walt Disney World® resort in Orlando, Florida, indicated in his biography *Creating Magic* that leaders, "...hire the right people, train them, trust them, respect them, listen to them, and make sure to be there for them when needed" (p. 27). When talking about his change from autocratic leadership to inclusive and authentic leadership he indicated that open door

policies and frankness with employees and patrons alike increased his ability to be trusted by his employees and see the problems that needed correction.

3. PURPOSE

The purpose of this research was to determine the correlation between scores on the ALQ and the perceived satisfaction with flight training quality of student pilots. The Authentic Leadership Questionnaire was developed by Avolio, Gardner and Walumbwa to measure self awareness, transparency, ethics/morality and level of balanced processing^[6]. Specifically, the concepts of transparency and balanced processing are of interest to this author. These concepts are elements that could conceivably contribute to the study of human factors and leadership in the cockpit environment as a lack of communication and transparency between instructor and student is likely to result in dissatisfaction in training.

As an initial investigation into the relationship between authentic leadership and flight instruction satisfaction, an exploration was initiated to determine whether or not authentic leadership affects student satisfaction in a flight training environment.

Based on the existing literature on the ALQ this researcher proposed the following hypothesis:

H0: There is no relationship between perceived flight instructor authenticity and student pilot satisfaction.

H1: There is a positive relationship between perceived flight instructor authenticity and student pilot satisfaction.

4. METHOD

4.1 Sample

All undergraduate flight students currently engaged in flight training operations at a mid-Atlantic university aviation program were surveyed following the procedure used by Walumbwa et al.^[6]. The target sample size was fifty respondents. Since there are fewer than twenty students in the program that identified them as willing to participate in the study, other flight students and instructors that trained at the flight training providers on the Eastern Shore were solicited for participation. Fifty (50) respondents agreed to participate in the survey.

4.2 Instruments

The Authentic Leadership Questionnaire (ALQ) was used to measure instructor authenticity. The Satisfaction with Life Survey (SWLS) satisfaction survey was utilized to determine the student's level of satisfaction with their flight instruction experience. The SWLS has a proven reliability and validity. The ALQ is currently being tested in to establish its validity. Students were asked to rate their perceived level of their instructor's authenticity.

Authentic Leadership Questionnaire. The ALQ consisted of sixteen (16) questions designed to measure perceived authenticity. The scale was developed by Walumbwa et al. [6] as a theory-based measure of authentic leadership and its subscales of self-awareness, relational transparency, internalized moral perspective, and balanced processing. Internal consistency reliabilities have been reported for each measure: self-awareness 0.73; transparency 0.77; moral perspective 0.73; and balanced processing 0.70. This scale is still in the process of being validated through continued operationalizing of the authentic leadership construct.

Satisfaction with Life Survey. The SWLS [26] has been found to have favorable psychometric properties. The SWLS consisted of five (5) questions. Both instruments utilized a Likert scale type format (ALQ: Not at all=0; Once in a while=1; Sometimes=2; Fairly often=3; Frequently, if not always=4. SWLS: Strongly Disagree=1; Disagree=2; Slightly Disagree=3; Neither agree or Disagree=4; Slightly Agree=5; Agree=6; Strongly Agree=7). A Pearson correlation was conducted to determine if there existed any correlation between total satisfaction results and total instructor leadership authenticity.

4.3 Procedure

Participants were selected by using convenience sampling. Pilots were given a study overview and consent form and then asked to complete a twenty-one question survey comprised of the ALQ and the SWLS. The composite scores of each instrument were entered into a Microsoft Excel © spreadsheet and later transferred to SPSS © version 17 for analysis. Alpha was set at 0.05.

5. RESULTS

The data, when scatter-plotted (Fig. 2) in Excel, showed a strong positive correlation (Fig. 2) between student satisfaction and perceived level of instructor authenticity ($r = .9182$). The correlation between the two variables was significant (** $p < 0.01$).

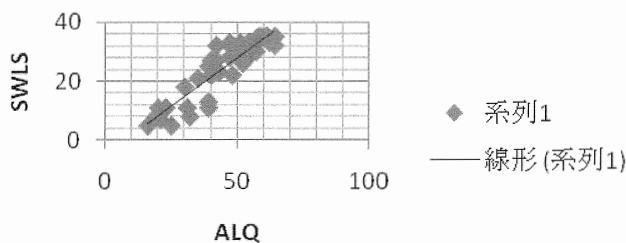


Figure 2 Satisfaction and Authenticity

The mean scores for the ALQ was (M) 47.38 out of a possible 64 and (M) 26.12 out of 35 with standard

deviations (SD) of 13.57 and 9.62 respectively (Table. 1). Pearson Correlation (r) was .912.

Table 1

Scale	N	M	SD	r	p	α
ALQ	50	47.38	13.57	.918**	0.00	.928
SWLS	50	26.12	9.62			

Internal reliability was tested by calculating Cronbach’s alpha (α) to check for possible measurement error with single variable measures. Cronbach’s alpha is a measure of internal consistency of the scale items (SWLS and ALQ) which describes how representative the items are of the content domain from which they are drawn [27]. The closer the alpha values to 1.0, the greater the internal consistency of the items on the scale. SPSS determined a Cronbach α value of .928 (Table 1).

6. DISCUSSION

In general, mean satisfaction and perceived flight instructor authenticity scores were high indicating that there is a relationship between the elements of the authentic leadership construct and satisfaction. Standard deviation results show the data points are close to the mean scores. With a relatively small sample size, strong positive correlations are still indicated between the two variables (leader authenticity and student satisfaction). The null hypothesis has been rejected and the hypothesis that authentic leadership is positively associated with individual student pilot performance (Satisfaction with instructor) has been accepted with significant (.912) findings. Additionally, mean scores of the SWLS were consistent with larger, national data sets (25.95 for our study compared to 25.8 in the Diener et al. study).

Limited studies have been conducted on the effects of leadership variables and leader satisfaction by followers in the cockpit environment [24]. Findings of this study indicate that characteristics of authenticity are correlated with perceived student satisfaction with their instructors. Students that indicated low satisfaction scores indicated that their instructors were less authentic. In the training environment, transparency, awareness, ethics (morality), and balanced processing are critical items in the learning process.

Transparency. The results indicate that openness of the training process is related to one’s level of contentment with the flight training experience. Examples of

transparency in flight training include the student's level of participation in the training process and open, honest evaluation of performance. Additionally, instructors that share any potential risks or hazards of maneuvers up-front, would be considered transparent.

Awareness. Awareness of one's own capabilities in flight instruction is beneficial to both student and instructor alike. When an instructor makes an error, it is best to not attempt to cover it up as students are quick to notice. A perceived lack of awareness in one's own abilities or of the environment as a whole can lead to lack of student confidence and ultimately satisfaction with instruction given.

Moral/Ethics. Instructor's values affect their everyday experiences and how others perceive them. In flight training, strict adherence to regulatory standards by instructors sets the bar for students to follow. Additionally, students who observe their instructor not complying with the standards set by the FAA are sent a message of unprofessionalism and this behavior can lead to dissatisfaction. Many instructors are building time to become Air Transport Pilots. Under Title 14 of the Code of Federal Regulations section 61.153(c), the FAA must determine the moral character of its applicants^[28].

Balanced Processing. Students are more satisfied with instructors that communicate with them regularly and include them in the decision making process throughout the training regime. Balanced processing is a key element in crew resource management in the flight instruction field and aviation in general.

Participants in the survey have indicated that instructors lacking in the key elements of the authentic leadership construct score lower in perceived satisfaction, whereas, instructors who they associate with high satisfaction levels were scored with higher levels of authenticity.

6.1 Limitations

Since this survey study only explores correlation between two variables, inferences to causality are not possible. The data collected was a cross-sectional view of flight training attitudes in a limited region and the study was not longitudinal in nature. This study does not make causal inferences but simply demonstrated that satisfaction is related to authenticity for a small population (N=50) in a specified geographic location. Additionally, sub-scales of the ALQ were not measured against the SWLS.

Perceived instructor authenticity and student satisfaction with instruction are likely linked because students feel more comfortable (safe) and therefore, satisfied with instructors who they perceive behave authentically (moral/ethical ways, share ideas and suggestions, are transparent and demonstrate a higher moral/ethical behavior).

6.2 Satisfaction as a plausible indicator of safety

Recent research has linked satisfaction with safety indicators in multi-disciplinary fields (Wolosin^[29]; Weingart, Price, Duncombe, Connor, Sommer Conley, Bierer, & Ponte^[30]; Wong & Cummings^[31]; Kim, McInerney, & Alexander^[32]). Wolosin^[29] contends that key elements in increased safety include open communication and shared values which are variables present in the authentic leadership model. Additionally, his research identified psychological needs as a powerful driver for consumer satisfaction and points out that in many studies conducted in a hospital environment, patient injuries fell as hourly rounding efforts increased. The overall results also increased patient satisfaction.

A study conducted by Weingart, Price, Duncombe, Connor, Sommer Conley, Bierer, and Ponte^[30] found poor communication (balanced processing in authentic leadership model) and lack of respect (ethics/morality) as a key contributor to incident reporting and overall dissatisfaction with service. Since the authentic leadership model and the SMS model adopted by the FAA rely on latent condition reporting, satisfaction can be an early predictor of system safety condition.

In a nursing leadership study conducted by Wong and Cummings^[31] researchers discovered positive correlations between nursing leadership and patient outcomes. More importantly, positive leadership behaviors and patient satisfaction significantly reduced hazardous latent conditions.

Similar research in the manufacturing field examined improved safety performance through increased employee satisfaction. Kim, McInerney, and Alexander^[32] studied employees and supervisors in four departments at a large nickel plating factory in the Midwest. Employee job satisfaction was measured using the Job Descriptive Index (JDI). These scores were compared to plant safety injury rates per department and absenteeism data. The data indicated that supervision satisfaction and work satisfaction had a positive correlation with safety performance indicators. Kim et al.^[32] determined that new innovations in the work place such as participative decision making, could increase job satisfaction and ultimately prevent accidents (p. 69). Participative decision making is similar to the balanced processing concept found in the authentic leadership model.

7. CONCLUSION

Leadership behavior has been identified as having an impact on how people think and affect other organizational elements such as satisfaction. Organizational leadership then has a powerful role in positively changing behavior in the National Airspace System (NAS).

Communication through balanced processing is an important tool to be utilized by leaders in their efforts increase the identification of latent conditions in the

system. Communication, however, does not occur automatically. Unsatisfied subordinates in a system are less likely to alert leadership of any impending hazards. It is the goal of every leader to impart their sense of moral and ethical responsibility in order to create an increased sense of purpose to exercise all safety efforts.

In its definition of safety culture the FAA ^[33] states, “The aviation service provider must make every effort to communicate its goals and objectives, as well as the current status of the organization’s activities and significant events. Likewise, the aviation service provider must supply a means of upward communication in an *environment of openness*” (p.19). The environment of openness is akin to leadership transparency and upward communication clearly identifies the element of balanced processing found within the authentic leadership model. Additionally, the SMS model identifies the need for employees to be treated fairly and justly. This necessity requires leaders to maintain high moral and ethical conduct while managing without fear of unjust penalization. By ensuring the level of leader authenticity, communication from the bottom up is increased and organizational learning regarding safety hazards in the system can be gained.

7.1 Recommendations for Future Research

Additional research to will need to be conducted in order to determine how authenticity directly influences safety culture and climate. Additionally, other contributing factors may increase or decrease the total effect on system safety. As the FAA continues to implement SMS policies, certified and non-certified aviation organizations will need to further develop methods to measure the effectiveness of their leadership to communicate a positive safety culture while listening attentively to subordinates (flight students included) in the system. Safety culture is the result of individual and group values, attitudes, competencies and management style. The results of this study show that the ALQ has potential to be used as a metric for measuring organizational factors related to aviation safety.

Future research to study the effect of additional variables associated with the SMS model combined with leadership authenticity is warranted. Other research in non-punitive response to error ^[34] has indicated that positive safety culture increases safety by removing fear of blame and punishment. In the flight training environment, instructors are encouraged to refrain from negative and unconstructive feedback that may reduce the student’s willingness to communicate safety specific information about their environment. Satisfaction, positive safety culture, and resilience are good candidates for a regression analysis study on how each affect safety measure(s) or latent conditions in an aviation organization. Additionally, this research would be a helpful tool to better operationalize the SMS model’s leadership component.

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