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HOMOGENOUS LEARNING STYLES AMONG AIRPORT MANAGEMENT PROFESSIONALS

David A. Byers

Abstract

Research on the career paths of airport management professionals included an assessment of learning styles to better understand the psychological profile of those m this career tield. Tbe Kolb Learning Styles Inventory, Version 3 (LSI-3) was used for the study for participants to self-assess their preferences for learning.

General research on the validity and reliability of the (LSI-3) indicates that a roughly equal number of the general population categorize themselves in one out of four categories (Accommodators, Assimilators, Convergers, or Divergers). In the research involving airport management professionals, more than two-thirds of the respondents categorized themselves as Divergers. Another 22% categorized themselves as Accommodators. With almost 90% of the sample population represented within two of the four LSI groups, the evidence strongly suggests that airport management professionals prefer to learn by carefully evaluating defmitive outcomes in a social environmental as opposed to action-based experimentation. Curiously, these results are diametrically opposite of similar research tor another aviation related career path – military pilots, most of whom (44.2%) categorized themselves as Convergers (Kanske, 1999).

This research may have implications in aviation education, particularly for recognizing that some students in collegiate aviation programs may have learning styles that are aligned with airport management professionals as opposed to other technically oriented aviation careers (e.g., commercial pilot). This understanding may be helpful in counseling students, particularly those struggling to fmd an aviation career path that better fits their preferred learning environment.

Introduction

In 2004, a research project investigating attributes of career-oriented airport management professionals was conducted to identify specific career development influences leading to an effort to measure career satisfaction and to develop a predictive model (Byers, 2004). Included in the overall research project, a commercially available learning styles assessment was administered to assess psychological attributes of survey participants as part of the broader topic of identifying and evaluating key attributes and relationships to career satisfaction in airport management. The purpose of this paper is to present the findings of the learning styles assessment, particularly since the results were unexpected and very unique compared to other aviation related careers and to the general population.

Background

Research regarding several attributes of airport management professionals was part of a dissertation project conducted in fulfilling the requirements of a PhD program at the Florida Institute ofTechnology located in Melbourne, Florida (Byers, 2004). For collecting data, an extensive survey instrument was developed which included a section for participants to self-assess their preferred learning styles. Permission to include the Kolb Learning Styles Inventory (LSI-3) in the overall survey was granted by the publisher with the provision that they would receive a copy of the

results and that publication of the actual LSI-3 instrument would be restricted to only survey participants. The review of the overall survey included vetting by the University's Institutional Review Board for research involving human subjects and was subsequently accepted by the doctoral review committee.

Sample

The target population included all airport management professionals working at commercial service and general aviation airports in the United States. The accessible population consisted of the more than 2,500 "executive" members of the American Association of Airport Executives (AAAE), a national airport executive organization . The executive membership category is reserved for only those actively engaged in airport management as a full-time employee of an airport.

Of the 2,566 surveys eventually distributed by direct mail, a total of 708 usable surveys were returned, representing a 28% sample of the accessible population. Out of the 708 surveys received, *655* participants responded correctly to the LSI-3 section. A power analysis, based on the test for close fit (MacCallum, Brown, & Sugawara, 1996, p. 14), indicated that at least 363 participants were required for power = .80 (df = 25) and a = .05. This minimum sample size provided an 80% chance that the sample data would support a hypothesized model with a *5%* risk that the correlations would be the result of random events or some other extraneous factors. With *655* LSI-3 respondents, this condition was more than satisfied.

Data from the results of the research were evaluated for reliability using Cronbach's alpha. Based on sample data, the reliability index was determined to be .88. According to Ary, Jacobs, and Razavieh (2002, p. 264), it is "meaningless" to make a general statement about whether an instrument is "reliable." Instead, researchers should "report the method used to estimate the reliability index, the nature of the group from which the data were derived. and the conditions under which the data were obtained. Potential users of [an instrument] then must take responsibility for determining if the reliability data would apply to their population" (p. 264). Ary et al's. comment notwithstanding , a Cronbach's alpha of .88 implies good reliability.

General Demographics of Airport Management Sample

Tables I through 3 provide a summary of key sample demographics . Table 1 presents participant demographics by gender. As reported here, males outnumbered females by a 5:1 ratio (n_M = 587, n_F = 120). While there was no distinctive difference in mean years of education, males had four years more airport management experience than their female counterparts ($M_{ExJ>-M}$ = 13.7, $M_{ExJ>-F}$ = 9.6). Table 2 presents participant demographics based on ethnicity. The overwhelming majority of subjects were Caucasian (90%) and the overall mean age of the subjects was 45.8 years. Subjects also had a mean of 16.8 years of education and 13 years of experience in airport management.

Table 3 shows aviation-related demographics of the study's subjects. Almost half of the male respondents had an aviation-related undergraduate degree (n=267) and 63% (n = 367) had some form of pilot certificate. Approximately one-third of females (n = 42) had an aviation-related undergraduate degree and 33% (n = 40) had a pilot certificate.

Table 1
Participant Demographics by Gender

	Age		Education•		Experienceb		Overall	
Gender	*M*	*SD*	*M*	*SD*	*M*	*SD*	*n*	%
Male	46.7	10.3	16.9	2.5	13.7	8.6	587	83.0%
Female	40.8	8.8	16.7	1.9	9.6	6.1	120	17.0%
Overall	45.8	10.3	16.8	2.4	13.0	8.4	707	100.0%

Note. Not every subject reported gender, age, education, or airport experience.
•Years of education. bYears of experience in airport management.

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Table 2
Particie,ant lJemo pe,hics b thnicity

	Gender		Age		Education•		Experienceb		Overall	
Ethnici!l:	M	F	*M*	*SD*	*M*	*SD*	*M*	*:SV*	*n*	%
Caucasian	537	100	45.8	10.5	16.8	2.4	13.1	8.5	637	90.1%
African American	23	9	45.1	8.1	17.3	1.3	11.2	7.1	32	4.5%
Hisoanic	11	7	45.5	9.4	16.9	1.4	14.1	99	18	2.5%
Asian American	5	2	43.7	9.5	162	2.5	11.6	7.2	7	1.0%
Native American	5	0	44.4	10.0	16.6	1.7	10.8	4.1	5	0.7%
Other/Not Reported	6	2	46.8	13.2	13.5	8.4	'10.8	6.7	8	1.1%
Ovt>ornll	'iR7	120	45R	101	lid	2_4	no	R4	707	1000%

Note. Not every subject reported ethnicity, gender, age, education, or airport experience.
•years of education. byears of experience in airport management.

Table 3
Particie,ant Aviation-Related lJemograe,hics ey *uender*

	Aviation-Related Degree		Pilot Certificate•		Overall	
Gender	UUD'	UO	*n*	o/o'	*n*	%
Male	267	86	367	63%	587	83%
Female	42	14	40	33%	120	17%
1)v rnll	31)9	lllll)	41)7	*5 %*	707	11)1)%

Note. Not every subject reported age, education, or airport experience.
aiincludes student, private, commercial pilot license or other FAA-issued certificate.
bUndergraduate degree. "Graduate degree. dpercent of sample by gender.

Kolb Learning Styles Inventory

As part of overall survey instrument, the Kolb Learning Styles Inventory, Version 3 (LSI-3) was used to collect information about learning preferences among airport management professionals. Published by the Training Resources Group, Hay/McBer (Kolb, 1999),the Kolb LSI-3 is designed to assess individuals' preference in how they perceive and process information. The Kolb LSI-3 consisted of 12 open statements with four ending selections. Individuals were asked to rank each of the four endings from best answer (1) to least (4) according to how they prefer to learn about something. For example, in the statement "I learn by...." possible endings included "feeling," "thinking," "doing," and "watching."

The LSI-3 uses four modes within the domain of experiential learning cycles. The concrete experience (CE) mode indicates a learning preference based on specific experience and by relating with people. The active experimentation (AE) mode indicates a learning preference by doing things and proclivity for being action oriented. The abstract conceptualization (AC) mode suggests a learning preference by thinking things through in a logical and systematic manner. The reflective observation (RO) mode indicates a learning preference using careful observation and understanding the meaning behind what is seen (Kolb, 1984).

People can be categorized further by using these preferences to form a quadrant with an *x-y* scale as shown in Figure 1. The AE-RO scores represent the x-axis left-to-right and CE-AC comprises they-axis top-to-bottom. If a person's score favors the AE and CE scales, falling into the upper left-hand quadrant, that person is labeled an *Accommodator* combining the learning styles ofboth active experimentation with concrete experience. A *Diverger* uses

both the CE and RO learning styles (upper right-hand comer) while an *Assimilator* uses RO and CE (lower right-hand comer). Finally, a *Converger* uses both AC and AE to learn, falling in the lower left-hand quadrant.

Results of the LSI-3 are expressed in terms of the magnitude of individuals' preferences for learning. These included (1) concrete experience (CE) – learning from feelings or reactions to experiences; (2) reflective observation (RO)- learning from watching and listening; (3) active conceptualization (AC) - learning from thinking and by systematically analyzing problems; and (4) active experimentation (AE) – learning by doing and observing results.

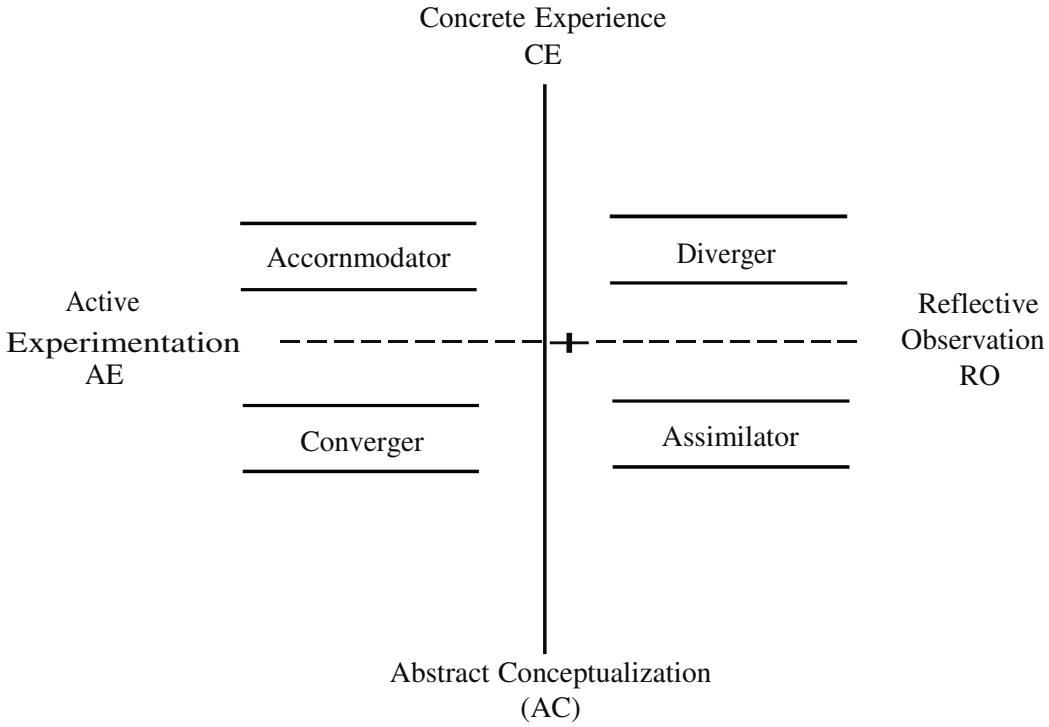

Figure I. Ko1b's Learning Style Preferences (Ko1b 1999).

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Since no one person relies on just one preference, results of the LSI-3 were also expressed in tenns of four different learning styles. For example, a *Converger* combines the learning preferences of abstract conceptualization and active experimentation, a *Diverger* uses both concrete experience and reflective observation, an *Accommodator* combines active experimentation and concrete experience, and an *Assimilator* uses reflective observation and abstract conceptualization (Kolb, 1999).

In developing a representative sample of learning styles among the general population, a sample of I,446 adults (638 males and 801 females) between ages 18 and 60 illustrated a nonnal distribution of the four learning preference profiles. The sample included AE (M= 35.37), AC (M = 30.28), RO (M = 29.94), and CE (M = 26.00). Along the AC-CE scale, the mean was 4.28 and along the AE-RO scale, the mean was 5.92 (Kanske, 1999).

Independenttesting of the randomized self-scoring fonnat used by the LSI-3 indicated very good internal consistency as measured by coefficient alpha with ranges of .58 to .74 among the four learning preferences (Kolb, 1999; Veres, Sims, & Locklear, 1991). Test-retest reliability as measured by zero-order correlations was also reported with a range of .98 to .99 among the four preferences within the replication sample (N = 1,042). This range indicates that very few subjects changed their learning classification among different administrations of the instrument. The Kolb LSI-3 has undergone major improvements since previous versions to enhance the psychometric specifications and practical uses over a wide range of educational and occupational settings. The publisher of the LSI-3 cites that since the initial publication of the Learning Styles Inventory in 1971, hundreds of studies have used the LSI, offering evidence of its validity and applicability (Kolb, 2000). Their review oflearning research literature across many different disciplines indicated that 83.3% of the studies evaluated provided support for the validity of the Learning Style Inventory methodology. (Kolb, 2000, p. 7).

LSI Results of Sample

Table 4 presents the results of the LSI-3 responses. Of the 655 participants who responded to the LSI-3 portion of the instrument correctly, 441 (67%) were categorized as Divergers. As previously discussed, Divergers are individuals who combine the modes of concrete experience and reflective observation to learn and to apply knowledge. Accommodators were the second most common learning style with 141 participants (22%) of the sample. Accommodators share a preference for concrete experience with Divergers as a learning mode but use active experimentation rather than reflective observation. Assimilators represented 9% of the sample (n = 62) while less than 2% of the sample (n = I I) was characterized as Convergers. Figure 2 graphically illustrates the results among the respondents who completed the LSI-3. The skewed AE-RO and AC-CE axes reflect the 50 percentile of the general population for each preference .

Table 4
Learning Styles of Survey Respondents

Learning Style"	*n*	%
Diverger	441	67%
Accommodator	141	22%
Assimilator	62	9%
Converger	II	2%
Overall	655	100%

"As defined by the Kolb Learning Styles Inventory, Version 3 (Kolb, 1999).

Respondents were given the opportunity to receive the results of their LSI-3 assessment by indicating their interest and providing their e-mail address. This served both as an incentive to participate in the survey and as a "member-checking" strategy for establishing an additional measure of credibility of the LSI results. The individual LSI results of the respondents' personal cognitive preferences and profile, and a description of the other categories were sent to 501 participants. Only two replies were received in which the participant expressed disagreement with the results. Their results were re-assessed and the respondents were sent a copy of their survey with an invitation to reconsider their responses. No further correspondence was received from either of them. On the other hand, replies were received from five other respondents who agreed with their LSI result. The general lack of responses was interpreted as that most all of the subjects were satisfied with their personal LSI results.

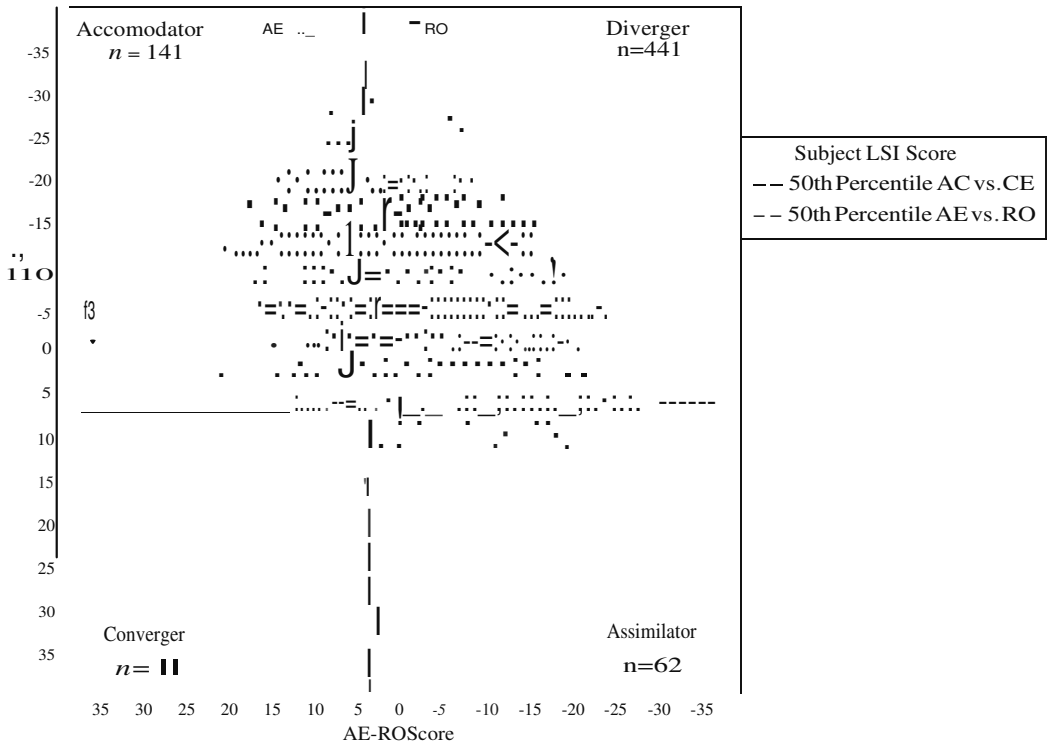

Figure 2. Respondents' Learning Styles (Kolb, 1999). $N = 655$. AE = Active Experimentation, CE = Concrete Experience, AC = Abstract Conceptualization, RO = Reflective Observation.

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Contrasting Studies

In a study of the learning styles among active pilots in the United States Air Force, Kanske (1999) used the Kolb Learning Style Inventory {LSI) to identify the preferences among Kolb's four learning styles. In a random distribution of the LSI instrument to 600 Air Force pilots throughout the nation (95% male, 5% female), 233 usable responses were returned. Kanske' s (1999) analysis of the data determined that 44.2% of the pilots indicated a Converger learning preference. The Assimilator style was preferred by 23% while Divergers and Accommodators were represented by 16.3% and 15.941/o of the pilots respectively. Another measure indicated that, along the AC-CE axis, the mean among the sample was 8.39, which was significant ($p <$ .0001). Along the AE-RO axis, the mean was 5.93, or virtually equal to the general population. This suggests that Air Force pilots, as a group, "would rather deal with technical tasks and problems than with social and interpersonal issues" (Kolb, 1984, p. 7).

Analysis

Study participants' self-reporting of cognitive learning styles as measured by the Kolb LSI-3 was used to identify one of many specific attributes of airport management professionals. Statistically, over two-thirds of the respondents were classified by their LSI-3 results as members of one group-Divergers (see Table 4). Adding the second largest group-Accommodators, an overwhelming majority (89%) of airport management professionals are categorized as having strong preferences for having concrete experience ("knowns" vs. "unknowns") and a bias toward reflective observation as their favored method oflearning. This observation implies that as a group, they would rather learn from other's examples as passive observers or in cases where 'tried and true" solutions are not available, are willing to seek answers by researching the facts before reaching conclusions.

The results of Kanske's research provides a curious contrast since his sample of military pilots were primarily characterized as Convergers which are diametrically opposite of the airport management's Divergers in the metrics of the LSI (Figure 2). While not a perfect comparison among aviation related career paths, it should be noted that a majority (58%) of airport management professionals responding to the survey held a pilot certificate (Table 3). The implication is that airport management professionals are attracted to their career path because it appeals to their environmental preferences in spite of their interests in aviation.

While it is an significant fmding to discover that a sample of airport management professionals demonstrated a strong tendency as a group toward concrete experience (CE) and reflective observation (RO) traits exhibited by Divergers, this characterization has no direct bearing on assessing or predicting success in career paths (Byers, 2004). Because psychological factors focused only on cognitive learning styles, it is plausible that if other factors such as general mental ability (e.g., IQ), personality traits as measured by an instrument such as the Wonderlic Personality Characteristics Inventory (PCI) or the Myers-Briggs Type Inventory (MBTI), or other psychological attributes (e.g., creativity) were assessed, substantial differences among airport management professionals might have been found. It is also possible that if a different learning styles assessment were used such as the Index of Learning Styles (Felder and Soloman, 2012) or Dunn and Dunn's Learning Style Inventory (Dunn and Dunn, 1987), then a significantly different result might have been discovered.

Investigation of psychological factors using the LSI-3 has implications for addressing career compromise (i.e., changing career aspirations) among students enrolled in collegiate aviation programs. As mentioned earlier, Divergers represented 67% of the sample and by definition are considered relational learners. Quilty's research (1996; 1997; 1999) on cognitive learning preferences among collegiate aviation students and commercial pilots suggested many aviation students have biases toward relational learning preferences whereas professional pilots do not. Quilty was not able to make the connection about what exactly happens to those pilot aspirants with strong relational learning biases but he suggested they may tend to "drop out or move on to other pursuits" (Quilty, 1999, p. 7). Although not directly discussed in Quilty's research, one direction these students may move toward is to a non-flight aviation major (e..g., management) and for some, on to a career that better fits their environmental preferences (Holland 1959, 1997).

Airport management as an aviation career choice seems to attract Divergers. This study also appears to support Kanske's' (1999) research on military pilots. Kanske used the LSI-3 and found that the majority of his sample of Air Force pilots indicated a learning preference as Convergers (44%). The LSI study of airport management professionals found that Convergers were the least prevalent (2%) of the four learning styles. One implication of this result is to suggest that airport management attracts people who would rather work in a social and interpersonal

environment than with technical tasks (Kolb, 1984).

Implications for Educational Practice

The results from this study have implications for educational practice. Career aspirations of students interested in aviation came from strong motivations and influences (Byers, 2004). Many students who have their heart set on becoming a professional or military pilot will encounter difficulties, either academically or in practice (i.e., flight training). It has been suggested that learning preferences research involving career aviation subjects identified that as a group, Quilty's (1999)professional pilots and Kanske's (1999) military aviators, have attributes distinctive from the general population. The learning preferences of airport management professionals are also distinctively different from the general population and divergent from military aviators (and by association, commercial pilots).

If this is the case, learning preferences could be used as a tool for developing an assessment model for identifying attributes for those who are seeking a meaningful career path in an aviation related profession . Administration of learning styles assessments could be appropriate especially for students in an aviation related college program during their 2nd or 3rd year where serious deliberation occurs for aspiring professional pilots who have strong relational learning preferences and may be experiencing difficulties in their flight education or training experiences.

As these students begin to question (perhaps for the very first time) their self-efficacy toward achieving their ideal career goal (e.g, professional or military aviation), educators can offer counseling about alternative aviation careers. Information from this research would be especially useful for counseling those students who appear to meet the learning preferences of airport management professionals (i.e., Divergers). Helping students matriculating in collegiate aviation programs to better understand the implications of their personal learning preferences may allow them to consider career alternatives that are aligned closer to their style and allow them time to adjust their course of study while still in the academic environment.

Further, collegiate aviation programs that offer airport-oriented courses such as management, planning, etc., or aviation career planning seminars may elect to include invitations for active airport management professionals to serve as guest lectures. Topics of discussion could include detailed descriptions of the airport's working environment, typical challenges, and specific skill sets and personalities required for success. Perhaps the example of the visiting professional's own personal career, particularly regarding aspects of their own environmental preferences and attraction to the airport management field can serve to inspire students to consider airport management as a viable career choice.+

David A. Byers serves as an associate professor for the Aviation Institute at the University of Nebraska- Omaha campus. He teaches courses in Airport Planning, Design, Finance, and Management in addition to courses for other aviation-related topics. Dr. Byers earned a Bachelor of Science in Air Commerce (Transportation Technology) from the Florida Institute ofTechnology, a Masters in Business Administration in Aviation from Embry-Riddle Aeronautical University, and a Ph.D. in Science Education (Aviation) from the Florida Institute ofTechnology. He also holds an FAA Commercial Pilot License with Instrument Rating and an Airframe & Powerplant Mechanic's License. He is a certified member of the American Association of Airport Executives (AAAE) and the American Institute of Certified Planners (AICP).

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