8-31-2016

Industry in Motion: Pilot Study on Instructor and Management Perceptions of New Hire Pilot Technical and Professional Preparation

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Cover Page Footnote

The aviation industry and airlines are in a perpetual state of change. This comes as a surprise to no one. On both a micro- and macro-scale, these changes are a result of many contributing factors ranging from legislative amendments, terrorism, normal and abnormal economic cycles and consumer expectations for service level and reliability. A subset of these changes, mostly at the airline customer service level, have been rather benign, including paying for a checked bag, or getting that same checked bag free with the use of the associated airline's credit card. Other changes in the industry have resulted in entire sections of the industry nearly disappearing or substantial renovations of training methodologies or new hire attraction and retention measures. With the institution of the "1500-hr rule" (Aeronautical Experience - Airplane Category Restricted Privileges, 2013) and FAR 117 (Flight and Duty Limitations and Rest Requirements: Flight Crew Members, 2014), airlines, collegiate-aviation institutions, and other sources of pilot supply have been forced to implement substantial changes to the overall landscape of pilot supply including how to staff, train and retain. What has not received as much attention and are the demographic considerations of the pilot supply itself? How is this new generation of pilots motivated? What types of issues are they facing during their respective transitions into the industry which are different from previous generations of new entrants into the field? How do these changing motivations and transitional factors influence how they are prepared both as a professional in the field and the technical knowledge they demonstrate during initial qualification? This pilot study – of pilots – is intended to serve as a foundation for future research, using the perceptions of airline instructors of their new hire pilots during initial qualification.

Background

If one spends any length of time with an educator it does not take long for the conversation to turn towards a lamentation about how poorly prepared students are for each lesson. This concern is exacerbated when there is a greater generational gap between the educator and the student According to Twenge (2009), "Many faculty members believe that the students in their classrooms today behave very differently than they themselves did, back in the 'good old days' when they were students" (p. 399). Often the educator has a feeling about student preparation that is expressed by stating, "...students these days just don't spend enough time reading…:" or, "...these kids spend too much time playing video games…" or even worse, "...students are so disrespectful these days, they ask questions that just aren't appropriate". It is apparent that there is considerable bias on the behalf of the educator described in these situations - or at least it is apparent to the students.

It is not uncommon that these same sentiments are expressed outside of the formal education environment in the so called "real world" of corporate education. During the course of this study, the authors focused on the perceptions of educators and students within the field of aviation specifically, the regional airline training program. The educators in this study have varying roles within the training environment. A new hire training process at a regional airline is very much a progression from basic skills and knowledge acquisition to advanced training procedures which eventually leads to on-the-job training done during normal line operations. At each of these phases of training, there are new educators that specialize in the skills and concepts within each phase. As the new hire progresses through the training program, they are trained and evaluated by a different instructor or set of instructors. Additionally, as the new hire progresses through the program the expectation is that they become more independent and competent to fill their eventual role as a crew member of a transport category aircraft. This means that the initial phases of instruction will develop foundational knowledge and skills and will involve more direct instruction and a small amount of evaluation. As the new hire progresses through the training program the amount of direct instruction decreases and the instructor takes on the role of an examiner of knowledge and skill. The final stage of the training program, called Initial Operating Experience or IOE, is almost entirely a consolidation and evaluation of procedures, technical skills, and systems knowledge acquired earlier in the training footprint.

State of Regional Airline Pilot Hiring

The airline industry is suffering from a pilot shortage that is affecting regional airline staffing. According to recent research on pilot supply, "For the years 2013 to 2031, there is a forecasted 35,059 pilot shortage. It should be noted that all forecasts lose accuracy over longer periods of time simply due to changing macro conditions." (Higgins, J., Lovelace, K., Bjerke, E., Lounsberry, N., Lutte, R., Friedenzohn, D., Craig, P., 2013). The pool of qualified airline pilot candidates has been depleted to the point that some regional airlines are not able to fill their new hire classes with enough airline pilots to maintain proper aircraft staffing. As reported in a recent article in Time, "When Republic Airways, a top regional airline, filed for bankruptcy in February, it in part blamed a lack of pilots." (Fitzpatrick, 2016). This is a stark contrast to the airline pilot hiring landscape leading up to the Great Recession, in which there were many more pilots seeking jobs than there were flight deck seats to fill. It is not within the scope of this study to discuss the cause of this shortage however, it is important contextual information that influences the present study.

AABI Accredited Schools

The Aviation Accreditation Board International (AABI) is a leadership and accreditation board that certifies aviation education programs all over the world (AABI, 2016). An AABI accredited school has met a defined set of standards and continues to maintain and improve upon these standards on an ongoing basis. The accreditation process assures students and future employers that the educational programs meet an industry standard of quality. As a result, graduates of AABI-accredited institutions are given some relief in the flight hour requirements required to become an airline pilot. In a traditional airline new hire classroom, the new hire cadre may have received their pilot training from one of several possible tracks ranging from Part 61 private instruction, military, Part 141 (non-AABI accredited), Part 141 (AABI/University), and in some cases training and experience received in a foreign country. Within the context of this study, it is important to understand the variety of candidates which may be entering the training footprint

Airline Pilot Training Process

Once a new hire pilot begins training for their new role as an airline pilot, they are introduced to and mentored by a variety of airline employees, within and outside of the training organization. The first group of employees the new hire will primarily interact with at a regional airline are the ground school instructors. The ground school instructors provide foundational instruction on general topics such as company policies and procedures, as well as specific technical topics relating to aircraft systems for the airplane that the new hire will be flying.

Once the student has completed initial indoctrination ground training, they proceed to aircraft specific training in general subjects, aircraft systems, flight training devices (FTD) and full motion flight simulators. This training is provided by other members of the regional airline training program. Upon completion of the flight training, the new hire is evaluated by another member of the training program called an Aircrew Program Designee (APD). Finally, the new hire progresses to in-aircraft training which is called operating experience (OE). This training is conducted during normal, revenue-generating, line operations and is done by a qualified training captain, often referred to as an OE Line Check Airman (flight operations training employee, personal communication, August 20, 2015).

Each of these members of the training program provide a unique perspective with respect to the new hire pilot. By surveying a random sampling of each of these members, it is possible to identify both professional and technical knowledge maturation of the new hire as they progress in the training environment from the

very beginning with the ground school instructors to the very end with the OE Line Check Airmen. Additionally, these members are observing different skills and knowledge as well as different modalities (for example declared knowledge or psychomotor skills).

Grounded Theory (GT)

The researchers in this study, having experience as either the recipients or providers of training (or both) within the airline industry and presently as educators within a collegiate aviation environment observed certain characteristics of their peers, trainees and instructors while in the airline training pipeline. These traits created a set of ideas regarding the characteristics necessary for success within the airline training initial qualification footprint. These general characteristics were roughly categorized as the new-hire pilot's observed level of (1) technical knowledge and (2) professionalism, however the instructor's role was also important to the outcome. The traits of the trainee can either be partially attributed to the individual (motivation, innate ability) or gathered through the educational footprint (Part 61, 141, collegiate, military, etc.) as the individual progressed into the airline career. As there was limited research and no specific pre-established theoretical framework, the researchers took an exploratory approach with the intention to expand the body of knowledge relating to new-hire pilot preparedness and success in a method similar to Glaser & Strauss' Grounded Theory of research (1967). One unique difference in this foundational research as that the respondents of the study were not the new-hire pilots themselves, but the instructors and management whom have influence over the pilot and their progress through the training pipeline. This is where GT is applicable. As noted in a recent publication focusing on GT:

> ''All is data.'' It's true that it doesn't really matter what type of data you are using, but you do need to understand that the data are gathered for a reason—that is, to allow the process of theoretical sampling to occur. In other words, you collect slices of data, analyze the data, and—based on that analysis—decide on the next wave of data gathering. (Walsh, Holton, Bailyn, Fernandez, Levina, & Glaser, 2015, p. 586)

Based on the results discussed below, it is anticipated that next phases of research will include interaction, expanded demographic data on both the instructors and new-hire pilots and include a larger group of respondents whom are involved in the training and mentoring of the next generation.

Study Purpose

The present study examined the level of preparedness and professionalism of new hire airline pilot candidates as perceived by a convenient sampling of management personnel, ground instructors, flight simulator instructors, and pilot examiners who are responsible for the new hire training and evaluation process at a regional airline in the United States. Of specific interest for this study was new hire technical knowledge relating to aircraft systems and company procedures and new hire professionalism. A primary objective of this pilot study was the validation of a survey instrument to be applied to a larger population within the airline training environment.

Review of Literature

Public Law 111-216

The present regional airline new hire pilot market is heavily impacted by Public Law 111-216 which mandated all first officers to have an Airline Transport Pilot certificate. Prior to this mandate, typical first officer hiring minimums would range from 600 – 1,000 total flight hours (Bjerke et al., 2016). Currently, the minimum hiring requirements for a first officer is 750 hours for pilots with military training, 1,000 hours for pilots with an aviation degree and 60 qualifying credits from an accredited university, and 1,250 hours for pilots with an aviation degree and 30 qualifying credits from an accredited university. This may seem like a small, incremental change, but it has had a significant impact on the availability of qualified regional airline pilot applicants as well as the training profile required for these new hire pilots.

It may seem that a more experienced new hire pilot would require less training before being ready to fill their role as a first officer at a regional airline. This was recently found to be a false assumption. Shane (2015) found that pilots who had 1,500 hours or more and were hired after the First Officer Qualification (FOQ) ruling required extra training events. In short, more experience does not necessarily mean more qualified.

Transitional Factors Between Higher Education and the Workplace

The transition from the undergraduate education into the working world has been studied extensively, but continues to change and evolve as education, receiving industry and – most importantly – those transitioning also change and evolve. This makes for the study of such topics a dynamic and somewhat inexact

science. A related subtopic are the generational factors which are inherent to selected age-dependent populations, commonly referred to as Baby-Boomers, Gen-X, Gen-Y and Millennials. It should be noted that the observations witnessed by those who study these generational differences are general characteristics of the population, and not specific to one individual or another within that population.

As they are the most recent entrants into the labor market, recent publications have focused on the Millennial generation. This generation, as with all those listed above, has a certain subset of traits, both considered positive and potentially somewhat less so. In *Educating the Invincibles,* Benfer & Shanahan (2013) studied the factors which supported and detracted from the success of clinical law students as they prepare for the transition to the working world. Of the characteristics outlined by the authors, those which supported the transition and were considered to be positive aspects by their respective employers and/or educators included: high ambition, quick learners, strong desire for responsibility, and inclination to work collaboratively (2013). Conversely, those students also generally exhibited certain characteristics which challenged the transitioning employee and employer's expectations regarding workplace professionalism and performance. The listed factors included high pressure to perform, concerns about making mistakes, perception of self-entitlement and narcissistic tendencies (2013).

As the authors conducted their research in a professional field (clinical law), certain parallels can be observed when comparing against the transitioning undergraduate student with pilot training and certifications into the professional pilot career path. Some of these characteristics include a *driven, focused employee population.* Professional piloting and clinical law practice both require a certain level of precision, motivation and attention to detail when compared with other disciplines, although many other disciplines also exhibit similar employee attributes/requirements.

In addition to generational factors, there are also cultural and discipline-related factors which affect the transition process of the student to the professional. A 2008 study focused on political science students, as separate populations, in Sweden and Poland. The researchers identified, through a specific interview method, key factors which influenced the Swedish and Polish students just before the entered the workforce and approximately one year after they were in their respective roles (assuming they were employed). Although the sample size was small (21 between both groups), they researchers did observe differences between Swedish and Polish students as they faced this transitional period. In addition to seeking the information on the preparedness of the students/employees, the authors explored selected subtopics such as cultural influences (between

Sweden and Poland), and economic factors endemic to the country and region. Interestingly, the authors noted the following with respect to the two populations:

> Polish students face numerous challenges, possible unemployment, lack of accommodation, a very low standard of living and poor salaries. The small group of Swedish students usually face different kinds of challenges, which are not existential in nature. They are, instead, occupied by questions such as whether their future employment will be satisfactory, whether their knowledge base is sufficient or whether they will be able to use skills in their profession. The task of coping with an uncertain future presents itself to both groups but in different shapes. (Johansson, Kopciwicz, & Dahlgren, 2008, p. 229)

When we consider the issues identified by Johansson et al. (2008), we can see that the professional pilot career may have a blend of the issues faced by the populations observed in the 2008 study. Although salaries have recently improved for the new hire pilot through bonuses and other incentives, based on experience and anecdotal evidence the first year wage was approximately $19,000 - $25,000 for the average regional airline crewmember. This created unique *existential* challenges similar to those witnessed by the Polish students in the 2008 study. At the same token, many new hire pilots are entering a field for which they have read about, studied, or discussed with mentors, but which they have not themselves experienced. In addition to the question of whether their previous undergraduate training will be adequate to prepare them for success in the professional pilot world, they also face personal stresses. Some of these personal stresses include significant absences from any home location, concerns over economic stability of the airline, company mergers or acquisitions, and potential changes to base location, aircraft, and ability to upgrade to a captain position.

Many of the factors listed above have been studied extensively, including one recent Portuguese study. Researchers Monteiro, Santos and Goncalves embarked upon a multi-year project to develop an assessment tool to determine factors which influence students as they transition from higher education and into the workplace. At the time of this publication, the assessment tool was a culmination of three iterations of mixed-methods research, finally resulting in what is known as the *Scale of the Meanings of Transition from Higher Education to Work, or SMTHEW.* (Monteiro, Santos, & Goncalves, 2015) The authors' position is that there are a multitude of factors which face students as they prepare to make the leap from the protected area of higher education into the unknown realm of the workplace, however, there was not yet a tool which effectively measured the impact

of these factors in a meaningful way. Although not an exhaustive list, some of the issues students face when approaching the point of transition were job market saturation, economic instability, temporary employment, emigration, personal and family pressures, and the desire for personal fulfillment and responsibility in the workplace. Through the course of the research, the authors systematically identified the key factors, starting with all respondents' feedback, and eventually determining four separate fields which seemed to form a construct around the issue of transition from higher education to work. The four principle factors, determined through statistical analysis, include Uncertainty, Responsibility, Personal Fulfillment, and Unemployment (Monteiro et al, 2015).

Acknowledging the "Halo Effect" on New Hire Ratings

There have been challenges with objective assessment of employee performance as long as there have been managers or trainers to observe and employees to assess. One of the primary, if not *the main* challenge is are the limitations associated with the human observer, or rater. One of these issues relates to the inability of the rater to separate aspects of the individual's nature and achievements (their global evaluation) and rate each individual aspect independently (Thorndike, 1920). Interestingly and apropos to this study, Thorndike's (1920) work evaluated the assessments of aviation cadets, however, in different areas including Physical Qualities, Intelligence, Leadership and Personal Qualities (or Character). The term coined by Thorndike is "generally defined as the influence of a global evaluation on evaluations of individual attributes of a person." (Nisbett & Wilson, 1977, p.250). This effect has been studied in a variety of disciplines including student nurses (Brown, 1968), student evaluations of an instructor with a British accent (Nisbett & Wilson, 1977), and clerical workers from a petrochemical company (Nathan & Tippins, 1990) amongst others. All of these tend to concur with Thorndike's original work. Mitigating the impact of the "halo effect" can be accomplished in one of several ways, primary being through statistical methods or through advanced training of the raters, called *inter-rater reliability*.

One unique proposal suggested that the *halo effect* is not actually a negative attribute at all, but recognizes the assessment of the individual as a whole, versus specific attributes. In fact there is suggestion that the *halo effect* actually improves the rater's accuracy. "Laboratory investigations using videotaped target rates consistently show that halo and rating accuracy are positively related." (Nathan & Tippins, 1990, p. 294) As it relates to this study, respondents were not provided specific training on how to answer the survey questions, however, are exposed to a form of *inter-rater reliability* training during their annual instructor standardization

meetings in the course of compliance with the requirements of the airline's Advanced Qualification Program (AQP) data collection requirements. Thus, some prior knowledge of evaluation and standard assessment can be assumed. One consideration which is a modification to the general requirements of the *halo effect* is that the respondents of the present study (raters) reported aggregate performance of their experiences with a specific subset of the new hire pilot group, versus observations of individual pilots. That recognized, individual raters may have strong impressions (both positive and negative) which may have influenced their overall ratings of the group. In some respects, a form of the *halo effect* is still present and applicable in this study. Future research should account for the influence of this statistical error.

The Generation Gap and Motivation

It is also possible that the generational differences between those providing the new hire training and those receiving the new hire training have a profound impact on the perceptions of motivation. The phrase, "…this new generation just does not seem to show any motivation…" is commonly heard in many disciplines. Is it true that the current generation is not motivated or is it true that the current generation is motivated differently than previous generations? The answer may be somewhere in the middle, but it is clear that different generations are motivated differently, often as a product of their up-bringing. The present research used survey data from the instructors who provide training to new hire pilots at a regional airline and as such, is a measurement of the perceptions of new hire performance and motivation. It is likely that the survey data includes many of the pre-existing biases that come with generational differences. (Twenge, 2009)

There are many variables to consider when ascertaining motivation of new hires as they progress from the post-secondary school environment into the workforce. There are a few theoretical frameworks that have been developed to understand motivation of students which can be applied to new hire pilots. To inform this research, we considered two theoretical constructs that have been found empirically sound; self-determination theory and achievement goal theory specifically relate to the current pilot study. Each of these frameworks will be discussed below in an attempt to identify applicable variables, as well as appropriate and established measures.

Motivation

Self-Determination Theory. Ryan and Deci (2000) proposed a theoretical framework in which both internal and external factors should be considered in

making assessments and predictions about motivation. It is proposed that there are three categories of motivations on a continuum between a self-determined student and a non-self-determined student. The location of a student along this continuum of self-determination has an impact on student motivation and potentially student performance and course completion. Guay, Ratelle, Roy, Litalien, (2010) proved a conceptual model that academic self-concept, facilitates autonomous academic motivation, which in turn facilitated achievement. In short, students who first had specific or global self-concept (belief about one's academic performance) had more autonomous academic motivation, which yielded higher academic achievement (Guay, Marsh, et al., 2003). This conceptual model could explain a causal factor for the variance in new hire motivation. A new hire who graduates from an accredited aviation program is likely to have a higher subject specific self-concept than a new hire who has not received specific training in the various facets of airline operations prior to his or her employment. Based on this assumption, it is possible that new hire self-concept increases as students' progress through the program, leading to an increase in autonomous academic motivation and a higher overall achievement as the new hire progresses through the training program. Conversely, a new hire who feels overwhelmed by learning the new topics being presented may be less successful in achieving the requirements of the training program.

The present study used two survey questions to measure the difference in perceived technical knowledge and professionalism of new hire pilots at a regional airline. Respondents where provided a list of the AABI accredited aviation schools and were asked to indicate the level of technical proficiency and professionalism difference between new hire pilots who graduated from AABI accredited aviation schools compared with new hire pilots who did not graduate from AABI accredited aviation schools.

Change/Stability of Achievement Goals. Elliot and McGregor (2001) proposed and tested a 2 x 2 achievement goal framework. This framework broke student achievement into four possible groups, mastery-approach, mastery-avoidance, performance-approach, and performance-avoidance providing further explanation for varying student motivation and academic achievement. Fryer and Elliot (2007) went further to determine change/stability of achievement goals over time. This research included three longitudinal studies in which achievement goals were assessed one week prior to course examinations. The results of each of these longitudinal studies found a significant decrease in mastery-approach goals after the first examination and before the second examination. Performance-avoidance goals showed a significant increase between the first and second examinations. None of the other goals showed any significant change throughout the study. It is possible that an individual's first encounter with a task or subject will have a

significant influence on goal change (Fryer and Elliot, 2007). With this in mind, it is possible to surmise that new hires without a degree from an accredited aviation program may experience significant goal and motivation changes as a result of their first encounter with the airline training program. It is possible that the experience of a new hire with little knowledge of airline procedures shift their achievement goal orientation and cause a significant decrease in student motivation after or during the initial training at a regional airline.

Method

Participants

Participants used in this research were 49 employees in a management or instructor role at a regional airline training department located in the United States. These respondents provided their individual perceptions regarding their observations and experiences working with or providing initial qualification instruction to new hire pilots. Participants were excluded under 3 conditions: Not involved in the training of new hire pilots ($n = 0$), haven't been involved in the training of new hire pilots within the last year ($n = 5$) or if they did not answer the question that asked for their role ($n = 6$). The remaining participants fell into 5 categories: ground instructor $n = 3$), simulator or flight training device (FTD) instructor ($n = 11$), Aircrew Program Designee (APD) ($n = 6$), operating experience (OE) line check airman ($n = 13$), management/supervisory personnel ($n = 7$). The final sample consisted of 37 participants. Refer to Table A1 in the Appendix for a table of the descriptive statistics of the participants.

The participants in this study provided generalizable perceptions of new hires entering the regional airline industry within the United States. The data gathered in this survey is expected to represent the perceptions of management and instructors of new hires during the initial qualification process at other regional airlines.

Measures

Research in the area of perceived technical knowledge and professionalism of new hire pilots is new and as a result, very few scales exist that applied directly to this research. Existing scales focus on self-perceptions of technical knowledge and professionalism. For this reason, new measurement scales were devised to measure the constructs of perceived knowledge and professionalism. The exploratory nature of this research make the development and proving of new measures for perceived pilot knowledge and professionalism appropriate. Perceived technical knowledge of new hires was measured by one scale which

contained eight items measured on a 5-point Likert-style scale (*1 = Not well prepared; 5 = Very well prepared*). All seven items were positively-worded, (*Please rate your general observations of new hire pilot knowledge of instrument procedures*). A high score correlated to a high level of perceived technical knowledge. Refer to Table A2 in the Appendix for a table of descriptives relating to these questions.

Perceived professionalism of new hire pilots was measured by one scale which contained six items measured on a 5-point Likert-style scale (*1 = Not well prepared; 5 = Very well prepared*). All six items were positively-worded, (*Please rate your general observations of new hire pilots arriving on-time for classroom training and briefings*). A high score correlated to a high level of perceived professionalism.

Procedure

The survey instrument was administered using Qualtrics online survey software. The survey was sent to participants at a regional airline located in the United States and participants were solicited by an email requesting voluntary responses. Each participant confirmed a willingness to participate by reading an informed consent form which appeared at the beginning of the survey before the measurements were administered and making a declaration of willingness to proceed with the survey. The survey was open for one month at which time the survey was closed and data was collected. The survey took about 8 minutes to complete.

Analysis

Distributions of responses were normal for the perceived technical with the exception of one item. This item asked the participant to "*Rate your perception of the new hire pilot's knowledge of abnormal and emergency operations.*" This item was positively skewed slightly outside of normal limits (skewness: 1.54). This highlighted a possible area of weakness with new hire pilot's knowledge of abnormal and emergency operations as it indicates that a large portion of participants rated new hire pilot's knowledge of abnormal and emergency items as below average. This is a somewhat expected result, given the low exposure to abnormal and emergency situations. It is also possible that this skewness is a result of the educator bias mentioned above, further research is needed to gain deeper insight. Distributions of responses were normal for the perceived professionalism items.

To test for construct validity an exploratory factor analysis (EFA) was conducted that included all items relating to technical knowledge and professionalism using direct oblimin rotation. Results yielded three factors with eigenvalues greater than 1.0, but the scree plot suggested a two factor solution. These factors aligned properly with the hypothesized scales, one based on perceived technical knowledge of the new hire, and one based on the perceived professionalism of the new hire.

The perceived technical knowledge measurement was determined reliable by a high Cronbach's Alpha ($\alpha = .87$). The perceived professionalism measurement was also determined reliable by an equally high Cronbach's Alpha ($\alpha = .91$). Each of the scales were then averaged into a new variable to determine appropriateness of the distributions given the larger constructs that were being measured. The new variable that represented new hire technical knowledge was normally distributed (skewness = .40; kurtosis = .16). The new variable that represented new hire professionalism was normally distributed (skewness = .90; kurtosis = .95).

For the purposes of exploring meaningful correlation for future research, the researchers grouped respondents based on two main criteria; when (chronologically) the new hire pilot interacted with the respondent and (2) balancing groups to achieve roughly equal distributions between groups. The data was grouped into three "Phases" by role. Phase 1 group was comprised of respondents who were either management or supervisory role and ground instructors, Phase 2 was comprised of FTD/full motion simulator instructors and Aircrew Program Designees (APDs) or simulator check airmen. The final Phase was strictly maintained as the OE instructors or OE line check airmen. These "phases", as noted above, are roughly arranged in chronological order based on time of interaction in the initial qualification (IQ) training footprint, and as a secondary benefit of this combination was to produce roughly equal groupings. As reported under descriptive statistics, Phase 1 had 11 respondents, Phase 2 had 17 respondents, and Phase 3 had 15 respondents.

Results and Discussion

The survey instrument used for this pilot study proves both valid and reliable. With respect to the preliminary results of this study, the researchers anticipate similar outcomes with a broader sample of the regional airline pilot training programs. Due to the exploratory nature of this pilot study, further investigation will be required to confirm findings included in this study.

The researchers noted several important points regarding the data, which will be beneficial for areas of future research. When viewing inter-item correlations, there were three strong positive correlations. These statistically significant correlations were (1) "Perceived knowledge of airline procedures and operations", (2) "Perceived communications with ATC", (3) "Perceived ability to use company manuals and procedures."

The data showed an increase in the means in perceived knowledge of from phase 2 to phase 3. This is an expected observation as new hire trainees are exposed to and practice airline procedures during the simulator training phase and subsequently apply those in the "live" operational experience environment.

The data showed a decrease in the means of perceived communications with Air Traffic Control (ATC) between Phases 1 and 2. This is an important point to consider as Phase 1 respondents may neither actively train, nor have an opportunity to effectively observe ATC communication abilities during the Phase 1 experience. This may lead to an inappropriate attribution of skills which may not have been observed in their entirety. Depending on the structure of the individual airline's training footprint and who may be performing that training, new hire trainees may not be afforded an opportunity to practice or demonstrate proficiency in standard ATC phraseology. Whereas, when trainees enter Phase 2 simulator training and checking, their ATC communication skills may be actively observed and critiqued. It is important to understand that this may be an area of improvement for many airlines who have a similar designed IQ training footprint.

In addition to examination of the factors associated with specific Phases of training, the researchers also performed statistical test on the individual responses (variables) in relationship to each other. Although significance was noted in all variables to at least one other response, it is important to consider both the significance and actual correlation coefficient values. While some coefficients were found to be significant, the correlation value only indicated a weak or weak to moderate relationship.

One of the perceptions which showed both the strongest and the greatest number of correlations to other responses was new hire *General Ability to Use Company Manuals and Procedures.* This data point showed moderate positive correlations with 11 other variables. The next variable with positive correlations was: *Arriving with the appropriate dress for the training event or flight.* This metric showed a positive correlation with 12 other variables. *General knowledge of aircraft systems* showed positive correlation to 11 other variables, with nine also being statistically significant. Showing similar significance to perceptions on manual usage was *Ability to receive and act appropriately on feedback from an*

instructor or examiner. This metric showed moderate positive correlations to ten of the other variables. *Knowledge of abnormal and emergency operations* showed statistical significance to eight other variables. Finally, the last variable with strong relationship to other variables was *Ability to show a positive attitude in the training environment.* This metric has a statistically significant relationship to ten other responses. Each of the correlations discussed above show statistical significance to the $p<0.05$ level.

Implications for Future Research

All of the responses and correlations discussed point to a larger picture on motivation and engagement of the new hire candidate. It is no surprise that a motivated new employee is going transition more successfully into the working world. During this transition this motivated and engaged employee would be ostensibly expected to perform better and be perceived as such by mentors/instructors than someone who does not have the same level of motivation and engagement. However, other considerations were noted during this research relating to instructor attitudes and influence on data collection, initial qualification footprint structure, and areas for additional focus during initial qualification.

Examining selected data points within the role and phase of training, certain patterns appeared which suggested that instructors' attitudes and expectations on trainees change as the phase of training changes. Additional research is needed to determine if or how these instructors' attitudes are impacting data collection (e.g. AQP data collection) as well as the long-term modifications and improvements to the training footprint which arise from analysis of collected data. Additionally, the structure of the training footprint itself may impact instructor perceptions on new hires, collected data, and how future footprint modifications could occur.

Though the survey instrument was found to be reliable and valid, certain demographic data was absent including age of the respondent (instructor/manager), years of service with the company, years of service in position, seat position (Captain or First Officer), years of experience instructing in Part 121. The addition of more demographic information in the revised survey instrument will allow for better categorical grouping and account for confounding variables. In the present exploratory research, many factors may influence the perception and ultimate response by the participant when measuring technical and professional readiness.

Limitations

This research was conducted using a convenient sampling of participants from one regional airline in the United States. This yielded a limited sample of

participants and in some cases, meaningful correlations needed a larger sampling. Additionally, this research only included the perceptions of instructors and did not include new hire perceptions of their own performance or factors related to motivation. Of these observations, the individual respondents were reporting aggregate experiences, versus individualized data on specific new hire pilots.

Conclusions

The researchers note relationships among key variables which could highlight areas for additional focus and scrutiny in the airline ground training footprints and preparation of incoming new hire pilot candidates in advance of initial hire. Responses which showed strong significance to other variables were distributed between both technical and professional preparation, which could suggest a separate, but related relationship between those general characteristics of a new hire candidate. The strongest responses also seem to paint a clear picture for what a successful candidate should focus on during their preparation in advance of and during initial training.

To illustrate this point, a new hire who appears to demonstrate competent knowledge on use of airline manuals and procedures is also likely to demonstrate a stronger understanding of aircraft systems as well as be able to apply that systems knowledge and aircraft manual familiarity effectively during training of abnormal and emergencies. From the professionalism perspective, a new hire who arrives in the training environment dressed appropriately is going to receive some benefit of the "halo effect" (Thorndike, 1920) by subsequent instructors with whom he/she comes into contact. This may create the perception that the pilot is showing a positive attitude in the training environment by respecting the professional appearance expectations of the career and also that he or she responds appropriately to feedback from the instructor or examiner, simply from the formal appearance and the respect which is carried by it.

An appropriate outcome of this foundational research is to create a picture of the factors which point to a successful outcome for a new hire as perceived by their respective instructor/evaluator. Through this effort, the researchers have found the survey instrument both valid and reliable. To continue refining the instrument for further data collection, the researchers determined additional response areas which will serve to enhance the survey instrument and illustrate a more complete representation of the interaction between student/instructor. Areas which the researchers will add to the subsequent iteration of the survey instrument include the following: age of the respondent, years of service with the company, years of service in position, seat position, years of experience instructing in Part 121. These data points will assist the researchers and partner companies, in two

areas: (1) evaluating their reported data through the perspective of their instructor cadre, and (2) proper training and coaching of both new and experienced instructors to ensure collected data is valid, reliable, and useful towards continuous improvement of the training system.

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Appendix

Table A1
Descriptive Statistics of Participants

Measures	*n*	%
Participant's Role		
Management	4	10.8
Ground Instructor	3	8.1
Simulator Instructor	11	29.7
APD or Sim Check Airman	6	16.2
OE Line Check Airman	13	35.1

Table A2
Descriptives of Survey Questions

Measure	Number of items	Anchors	N	α	*M*	*SD*	Actual range
Technical Knowledge*	7	1 = *Not well prepared* 5 = *Very well prepared*	35	.87	4.00	.52	2.86-5.29
Professionalism*	6	1 = *Not well prepared* 5 = *Very well prepared*	27	.91	4.27	.62	3.33-6.00

* As perceived by research participant.

Table A3
Correlations of Perceived New Hire Preparedness

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
1. Instrument Knowledge	-															
2. Airline Procedures Knowledge	.43**	-														
3. Communications Knowledge	.43*	.61**	-													
4. Aircraft Systems Knowledge	.47**	.46**	.43**	-												
5. Limitations Knowledge	.37*	.35*	.53**	.79**	-											
6. Emer. Procedures Knowledge	.36*	.44**	.54**	.56**	.66**	-										
7. Manual Usage	.56*	.51*	.63**	.51**	.56**	.59**	-									
8. On Time	.04	.15	.19	.34*	.35*	.40*	.33	-								
9. Preparation	.33	.41*	.20	.51**	.38*	.38*	.46**	.52**	-							
10. Appropriate Dress	.38*	.47**	.34*	.56**	.46**	.46**	.46**	.40*	.66**	-						
11. Positive Attitude	.44**	.19	.32	.38*	.36*	.45**	.45**	.49**	.65**	.63**	-					
12. Response to Critique	.50*	.23	.27	.41**	.45**	.36*	.52**	.45**	.69**	.54**	.70*	-				
13. Crew Resource Management	.33	.13	.33	.28	.28	.44**	.40*	.49**	.57**	.62**	.56**	.70**	-			
14. Comparative Knowledge	.11	-.14	.08	-.07	.06	-.06	.25	.40*	.17	-.09	-.12	.22	.11	-		
15. Comparative Professionalism	.13	.05	.05	-.20	-.05	-.06	.13	.06	.12	.16	.16	.36	.27	.68**	-	
16. Phase of Training	-.01	.02	-.21	-.09	-.23	-.01	.07	.02	.24	-.06	.11	.04	-.03	-.37*	-.20	-

* Indicates significance at the 0.05 level
** Indicates significance at the 0.01 level
*** Indicates significance at the 0.001 level

Industry and University Alignment Survey Instrument

[Consent Statement – Removed]

○ I have read the informed consent statement and AGREE TO PARTICIPATE.
○ I PREFER NOT TO PARTICIPATE at this time.

Do you currently work in a role training, evaluating, OR overseeing the training and evaluation of pilots or pilot candidates (trainees)?

○ Yes
○ No

What is your role within the training process of new-hire [Company] pilots? (If you are in more than one role, select the option in which you spend MOST of your time).

○ Ground Instructor
○ Full Motion Simulator or FTD Instructor
○ Aircrew Program Designee (APD) or Sim Check Airman
○ OE Line Check Airman
○ Management or supervisory
○ Other, please specify _____

Within the last year, have you provided training in a classroom, Flight Training Device (FTD), full motion flight simulator, or physical aircraft to any pilot or pilot-trainee seeking additional certificates or ratings at [Company]?

○ Yes
○ No

Please rate your general observations on the following areas of TECHNICAL KNOWLEDGE of new-hire [Company] pilots? (Please rate your overall observations, it is understood that individual differences exist).

	No Observation (Not applicable)	Not well prepared	Below average	Average	Above average	Very well prepared
Knowledge of instrument procedures.	○	○	○	○	○	○
Knowledge of airline procedures and operations	○	○	○	○	○	○
Communications with ATC	○	○	○	○	○	○
General knowledge of aircraft systems	○	○	○	○	○	○
General knowledge of aircraft limitations	○	○	○	○	○	○
Knowledge of abnormals and emergency operations	○	○	○	○	○	○
General ability to use company manuals and procedures	○	○	○	○	○	○
Other - Please comment	○	○	○	○	○	○

Please provide any additional commentary regarding new-hire pilot TECHNICAL KNOWLEDGE. (This response applies to all interactions with 'new-hire' pilots with whom you've interacted).

Please rate your general observations on the following areas of PROFESSIONALISM of new-hire [Company] pilots? (Please rate your overall observations, it is understood that individual differences exist).

	No Observation (Not applicable)	Not well prepared	Below average	Average	Above Average	Very well prepared
Arriving on-time for classroom training and briefings	❍	❍	❍	❍	❍	❍
Arriving well-prepared for classroom training and briefings.	❍	❍	❍	❍	❍	❍
Arriving with appropriate dress for the training event or flight.	❍	❍	❍	❍	❍	❍
Ability to show a positive attitude in the training environment.	❍	❍	❍	❍	❍	❍
Ability to receive and act appropriately on feedback from an instructor or examiner.	❍	❍	❍	❍	❍	❍
Ability to work effectively as a crew (demonstrate CRM skills).	❍	❍	❍	❍	❍	❍
Other please note	❍	❍	❍	❍	❍	❍

Please provide any additional commentary regarding regarding new-hire pilot PROFESSIONALISM.   (This response applies to all interactions with 'new-hire' pilots with whom you've interacted).

[Company] trains pilots from a multitude of backgrounds and experiences. With respect to your SPECIFIC experiences working with new-hire pilots who were trained at four-year undergraduate institutions accredited by or affiliated with the Aviation Accreditation Board International (AABI), how would you rate their TECHNICAL KNOWLEDGE against peers whom did not attend such institutions? Note: Examples of AABI accredited or affiliated institutions include: South Dakota State University, University of North Dakota, Mankato State University, Bridgewater State, Kansas State, Kent State, Oklahoma State, SE Oklahoma State University, University of Oklahoma, Western Michigan, University of Nebraska - Omaha, Southern Illinois University, Purdue University, Louisiana Tech University, Middle Tennessee State University, Auburn University, Arizona State University

○ Much Lower
○ Slightly Lower
○ About the Same
○ Higher
○ Much Higher
○ No basis for judgment

[Company] trains pilots from a multitude of backgrounds and experiences. With respect to your SPECIFIC experiences working with new-hire pilots who were trained at four-year undergraduate institutions accredited by or affiliated with the Aviation Accreditation Board International (AABI), how would you rate their PROFESSIONAL PREPAREDNESS against peers whom did not attend such institutions? Note: Examples of AABI accredited or affiliated institutions include: South Dakota State University, University of North Dakota, Mankato State University, Bridgewater State, Kansas State, Kent State, Oklahoma State, SE Oklahoma State University, University of Oklahoma, Western Michigan, University of Nebraska - Omaha, Southern Illinois University, Purdue University, Louisiana Tech University, Middle Tennessee State University, Auburn University, Arizona State University

- ⃝ Much Lower
- ⃝ Slightly Lower
- ⃝ About the Same
- ⃝ Higher
- ⃝ Much Higher
- ⃝ No basis for judgment

Please provide any other comments you believe would be appropriate to include in this survey response.