Interpersonal Skills in Aviation: Applications and Development

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The purpose of this paper is to highlight the critical role that interpersonal skills play in the aviation environment. Many volumes have been written on the matter and it is not our intention here to review every research endeavour in interpersonal skills and aviation but rather to provide an overview of some of the more important research, drawing out the implications for aviation management. The paper is organized in the following manner: We first examine what interpersonal skills are and why they are important in aviation. This is followed by an examination of the literature on interpersonal skills in selection (pilots, air traffic controllers), which in turn is followed by interpersonal skills and training, especially in Crew Resource Management(CRM). The paper concludes with practical suggestions regarding interpersonal skill development.

Interpersonal Skills

Think about someone whom you know who has good skills when dealing with others. Now think of someone who lacks those skills. How do these two people differ? Assuming all other things are equal, with which one would you prefer to work? Who would you employ? Why? Why on so many occasions does the interview discriminate among people of equivalent qualifications? This is the field of interpersonal skills. It has been attracting increasing interest over the last decade. Gardner, in fact, redefined the whole notion of intelligence by including interpersonal intelligence among six other factors which he believed indicated an individual's "smartness".

He defined interpersonal intelligence as :

> "..the ability to understand other people: what motivates them, how they work, how to work co-operatively with them. Successful salespeople, politicians, teachers, clinicians and religious leaders are all likely to be individuals with high degrees of interpersonal intelligence."
> (Goleman, 1997, p. 39)

Interpersonal skills refer to effective communication skills that individuals use to convey both simple and complex messages to one another. People skills such as empathy, encouragement, considerateness, helpfulness, supportiveness, benevolence, sensitivity, social adeptness, motivation, and understanding are attributes that come to mind when we discuss interpersonal skills and it is not surprising that organizational psychologists report floundering productivity if these attributes are ignored when people are brought together to work in teams (Rosene, 1997). Psychologists now talk of two major intelligences, the more traditional Intelligence Quotient (IQ) and the more recent Emotional Intelligence quotient (EQ) developed by Goleman (1997). EQ describes qualities of understanding one's own feelings, empathy with others and the feelings of others, and the regulation of emotions to enhance living. Of course, some peopledisplay both intelligences, some more of one than the other (Think of the people we asked you to think of above). Indeed, one of the leading figures in human factors in aviation, Robert Helmreich, contends that effective aviators need strong interpersonal skills in addition to technical expertise, aptitude and training (Helmreich, 1993; 1996). We extend this by arguing that this need extends well beyond the cockpit to include cabin crew, maintenance, and ramp crew, as well as others in the organization, including managers and air traffic controllers (ATCs).

The concern for effective interpersonal communication arises in the paradoxical social environment of increased automation. Although society is becoming increasingly automated, it is of particular importance to examine the interpersonal skills of personnel in the aviation industry in that their level of responsibility for human lives is high and that they face the challenge of continual changes and increased usage of automated equipment. This concern has been echoed by researchers investigating the recent automotive and

technological trends in the commercial aviation industry and their effects on the quality of interpersonal communication on the flight deck and in air traffic control. (Billings, 1991,1997; Moore & Telfer, 1997; Mouloua & Parasuraman, 1994).

In a lengthy treatise relating social isolation to the increase in human unhappiness, particularly in Western society, Karp (1996) asserts that a withering community life brought about by new technologies fosters a rootlessness and social disintegration that contributes substantially to the growth of emotional disorders. If such consequences can be observed in society as a whole, then it could be expected that automation in aviation is likely to produce some change in human behavior. Karp also posits that occupational status and identification with that status defines our interpersonal behaviors. This is supported by research which shows that the type of occupation has a strong relationship with socialization processes and outcomes (Holten III & Russell, 1997). The changes in roles for aviation personnel as a result of automation, therefore, also stand to have a significant impact on their self-definitions and their subsequent relationships with others, and others with them. The raising of such issues is to be seen in a context in which interpersonal skills may be receiving less attention (e.g., it may be easier to break relationships now, compared to 20 years ago). Moreover, the importance of the individual's functioning within the group has been replaced by the individual's satisfaction with the self and the improvement of the self. More than a decade ago, Lasch (1982) referred to this focus on the self as "the culture of narcissism." Yet despite this shift from communal to self focus (a Western society phenomenon), more interpersonal skills are being sought in the workplace while the interpersonal aspects of human behavior (such as group cohesion and abilities to work successfully in a team) are being downplayed in society.

Given that interpersonal issues are in some way biologically determined, the need for interpersonal communication and interactions are central to being "human." Bowlby's (1988) theory on human attachment goes some way in explaining this biologically determined need to relate to others. Bowlby asserts that attachment is a fundamental form of behavior with its internal motivation distinct from the basic drives (such as feeding and sex) and is important for survival. Basically attachment is defined as any "behavior that results in a person maintaining proximity to some other clearly identified individual who is conceived as better able to cope with the world"(Bowlby, 1988, p 27). Such behavior becomes most obvious in stressful situations as the attachment figure encourages strong and pervasive feelings of security, which further reinforces the attachment. The biological function attributed to it, is that of protection. Clearly, then the benefit of relating well to others helps to enhance attachment behaviors and consequently protects the functioning of the group. Beaumont (1995) applied attachment theory to aviation management and has suggested that the development of attachment between the employee and the organization (as a mutually dependent process) produces harder working organizational members, who are less likely to be absent from work.

In summary, then, interpersonal skills, though essential in group and organizational functioning have not received the attention they deserve in terms of their impact on organizations, which include selection, training, and management of employees. In the area of aviation, communication is of integral importance, because as the following information demonstrates, it is not simply a matter of whether an organization is functional or not, but it becomes a matter of life and death.

The Importance of Interpersonal Skills in Aviation

i) Human error in aviation : the contribution of interpersonal communication

Perhaps the easiest way to understand the relevance of interpersonal skills in aviation is to consider accidents and incidents. Much has been written about the underlying causes of these in commercial as well as military aviation (e.g., Brannick, Prince, Prince, & Salas, 1995; Leedam, 1991; NTSB Reports in the USA; Shappell & Wiegmann, 1997: and more generally in Reason, 1997; Weiner & Nagel, 1988; and Weiner, Kanki & Helmreich, 1993). Threading its way through these reports is a reasonably consistent theme of human error resulting from failures in interpersonal communication. Indeed, cockpit crew, cabin crew, dispatch, maintenance, air traffic control, and even the passengers are implicated in some way or another, dependent upon the particular case. For example, in the Kegworth B-737 incident, cabin crew were aware of an engine problem but failed to inform cockpit crew who shut-down the other engine which lead to a fatal crash. Passengers and cabin crew on the Dryden Fokker F-28 were aware of a build-up of ice on the wings before take-off but failed to communicate this to the cockpit crew. The aircraft crashed shortly after take-off with

fatal consequences.

Recent research by Goeters (1995) with experienced pilots showed that nearly half of the problem cases in a sample of nearly 200 pilots were related to interpersonal factors, not technical performance. Some time ago, Chidester and Foushee (1989) examined leader personality and crew effectiveness in a full mission simulation experiment. Three-person crews completed real-time flight segments in a high fidelity simulator with captains of different goal orientations and interpersonal skills. Some captains were highly motivated to achieve, as well as having warmth and sensitivity towards others. Other captains were assessed to be high on wanting to achieve but low on the interpersonal dimension (e.g., verbally aggressive). Still others were assessed as low on both achieving and interpersonal skills. When ratings of effectiveness of crews were examined, Chidester and Foushee found that crews led by captains high on both achieving and interpersonal skills outperformed others. In addition, crews led by captains low on sensitivity to others made more operational errors.

Reporting on a subset of the crews from the above study, Kanki and Palmer (1993) took a communications perspective. Again, crews were led by captains of three different profiles: high on both achieving and interpersonal; low on interpersonal skills; and low on both achieving and interpersonal. The preliminary findings show some interesting patterns of communication that reinforce the findings from the Chidester and Foushee (1989) study. Captains low on interpersonal concerns initiated less total speech than other captains, and importantly, these crews committed most errors. For captains high on both dimensions, the results showed that the flow of information was encouraged, but not dominated by the leader. The researchers also noted that providing and seeking information were more prevalent in the crews led by captains concerned with both doing well and enhancing interpersonal relationships on the flight deck. Not only do these findings demonstrate the significant impact that increased *frequency* and freedom to communicate to other team members have on human errors leading to aviation disasters, but they support the basic principles of attachment theory as applied to the cockpit. High achieving (i.e., highly competent), yet warm and sensitive captains create an atmosphere of security, where individuals can communicate concerns because they feel interpersonally protected. On the other hand, it could be argued that captains low on interpersonal concerns do not

provide the protective and secure environment that encourages a mutually dependent attachment and consequently impedes individuals' confidence to express concern or seek clarification (Beaumont, 1995; Bowlby, 1988).

However, it is not only the frequency of communication that effects efficiency, Orasanu and Fischer (1991) similarly investigated communications in experienced aircrew simulations and found that *shared communal goals* impacted on outcomes. Captains of effective crews in their study planned (with their co-pilots) during periods of light workload for future difficulties and alerted crews to likely problems, building a shared mental model of the situation. Bowers, Deaton, Oser, Prince and Kolb (1995) also demonstrated that effective crews used similar patterns of interpersonal communication (observations, replies, statements of intent) in automated and less automated cockpits. Less effective crews, however, varied their interpersonal interactions, dependent upon whether they were in an automated on less automated context. Hence another significant interpersonal factor which effects outcomes is the *consistency of the communication.* This effective crew sharing is underpinned by interpersonal skills. Of course, communication includes non-verbal cues that are also an important component of flight deck communication and coordination (Segal, 1994).

Nevertheless, these skills need to be considered in the context of the social climate in the cockpit where relations between the pilot and co-pilot are crucial in establishing communication patterns. For instance, Farthofer and Kemmler (1993) highlighted the stages at which interpersonal relationships are critical in setting the social climate in the cockpit. Their interview data indicated the importance of the first contact between pilot an co-pilot when they meet at dispatch. The interpersonal skills demonstrated at that stage seem to set the climate for what follows throughout the flight.

ii) Examining interpersonal skills through psychometric measurement

Another way of looking at the role of interpersonal skills in aviation is to examine the psychometric properties of the NASA/University of Texas Cockpit Management Attitudes Questionnaire (CMAQ), a questionnaire used worldwide to assess attitudes in the cockpit. While the CMAQ has been updated by the addition of new items (related to culture, automation, work values, team behaviors) and is now the Flight Management Attitude Questionnaire (FMAQ), its original factor structure shows a consistent pattern related to

interpersonal skills (Gregorich, Helmreich & Wilhelm, 1990). In their factor analyses based on nearly 5,000 aviators, the questions that loaded most strongly on the Communication and Coordination scale were those related to the interpersonal area of empathy towards others: (a)monitoring *others* for signs of stress, (b) being sensitive to the personal problems of *others*, and (c) taking into account *others'* personalities. It is not surprising, then, that Hormann and Maschke (1991) found a significant relationship between the Empathy scale from the personality test, The Temperament Structure Scales, and the CMAQ Communication and Coordination scale. The FMAQ also shows interpersonal dimensions, many of which seem to transcend culture (Merritt & Helmreich, 1995).(See also LOFT below.)

iii) The effects of interpersonal skills on performance

Hormann, Manzey, Maschke and Pecena (1997) related pilot operational performance to interpersonal skills. They showed that pilots high on the interpersonal dimension of empathy were independently rated as high on crew coordination and performance in the cockpit. This finding is all the more interesting in that the measure of empathy was behavioral (rather than from a questionnaire or interview) and had been obtained while the pilots were involved in group activities during the selection process.

Also using behavioral measures, Jones (1997) showed that the avoidance of mishaps in air traffic control (ATC) operations was related to interpersonal factors. Observations were taken as air traffic controllers controlled air space with task management, information sharing and interpersonal relations emerging as predictors of performance. Individuals who displayed sensitivity, flexibility and receptivity avoided mishaps more than those who did not display such interpersonal skills. Inadequate communication and co-ordination between ATCs and between ATCs and pilots have been identified in a number of studies as the major contributor to ATC operational errors. Interpersonal skills, such as being receptive to others' concerns and disagreeing but not allowing such differences to enter into decision making, are vital for the successful operation of a team in such a situation (Herschler & Gilson, 1991).

Researchers examining simulated emergency evacuations from aircraft also clearly identify the critical role of the interpersonal behavior of flight attendants. Muir and Cobbett (1996) studied passenger evacuations under two conditions, competitive (simulating threat to life/evacuees paid cash

incentives to be in the first group off the aircraft) and co-operative (simulating non-life threatening with no cash incentives). In both conditions, flight attendants who were assertive, were more successful in exiting passengers in a shorter time than if they were non-assertive. Muir and Corbett reinforced the need to train flight attendants in assertive behaviors in the required contexts. Even in aviation maintenance, interpersonal factors are implicated. Hobbs and Robertson (1996) refer to the "Dirty Dozen" in aviation maintenance which includes lack of communication, lack of teamwork, and lack of assertiveness.

In summary then, literature on interpersonal skills in aviation, has been mostly concerned with pilots. Interpersonal skills which include enhanced flow and frequency of communication (Chidester & Fouschee, 1989; Kanki & Palmer, 1993), shared communication goals or shared mental models (Orasanu & Fischer, 1991), consistency in communication patterns (Bowers et al., 1995); personality traits such as empathy (Hormann & Maschke, 1991) ;and the context in which they occur (i.e. cockpit, flightdeck, etc) (Farthofer & Kremler, 1993) effect performance and decision making processes and have significant implications for human error and safety in aviation. In other words, teamwork, open lines of communication, cooperation, listening and speaking one's mind, the rudiments of social intelligence are essential features for training pilots and go hand in hand with the importance of their technical prowess (Goleman, 1997).

Interpersonal Skills and Selection

Much has been written about selection of pilots and interpersonal skills, although it has often been the case that personality tests designed to assess stable personal traits have been used to assess interpersonal skills. It has been argued elsewhere that interpersonal skills may, in fact, be more amenable to change than the stable traits measured by standard personality tests and as such may not be true estimates of an individual's interpersonal skill (Monfries & Moore, 1996).

In one of the most comprehensive reviews of pilot selection, Hunter and Burke (1994) employed meta-analytic methods to illustrate the relatively low predictive power of personality tests, when compared to mental abilities (spatial ability, mechanical ability), for future pilot performance. Bartram's (1993) research also demonstrates the relatively low predictive power of selection measures. However, one of the problems of correlating selection test scores with an

individual's latter performance on some task is the nature of the latter task. If the task does not require strong interpersonal skills, then it may not be surprising that any relationship would be low (See Cognitive Task Analyses below). What is required early in a career (say as a second officer) may not be what is required later in a career (say as a captain or line manager).

Individuals do develop in organizations through professional socialization (Farquharson, 1997; Goleman, 1997; Karp, 1996) and it might be said that IQ is important for selection but EQ (the emotional intelligence) is important for promotion. For instance, Goleman asserts that effective leadership can only be achieved by excelling in emotional intelligence. He stresses that leadership is not domination, but the art of persuading people to work towards a common goal wherein being attuned to others' feelings and being able to manage disagreements so that they do not escalate are paramount.

How, then, do organizations select individuals with good interpersonal skills? While it has been noted that the assessment of interpersonal skills is difficult (Hackman, 1993), this is no reason not to attempt such assessment, as long as the problems of any selection process and its ability to predict future performance are kept in mind (See Hunter & Burke, 1994; Martinussen, 1996). Interpersonal skills questionnaires such as the Survey of Interpersonal Skills (Gordon, 1993), the Styles and Attitudes Survey (Tyler, 1992) and the Personal Characteristics Inventory (Gregorich, Helmreich, Wilhelm, & Chidester, 1989), as well as performance in interviews (Ramsay, Gallois, & Callan, 1997) can shed light on the ways in which individuals see themselves interacting with others. Observation of team activities, personal presentations, and team operated simulations during selection could be used hand-in-hand with the self-report questionnaires to provide a broader understanding of an individual's interpersonal skills (Hormann et al, 1997; Monfries & Moore, 1996, 1998).

Some of the work of Monfries and Moore (1996) and Moore and Monfries (1997) highlight the role of interpersonal skills in selection of pilots. Working with experienced pilots who were seeking entry into a small international carrier, they showed interviews and the interpersonal dimension of Conformity (Gordon, 1993) were the major predictors of whether or not a pilot was selected. Conformity refers to an interpersonal predisposition to follow the rules, and "do the

correct thing." The selection program involved the typical measures of mental abilities, personality, interviews, and simulator testing.

The recent use in selection of job analysis, task analysis and cognitive task analysis (Redding & Seamster, 1994) also shows the importance of interpersonal skills. In job and task analyses, the key components of the job are identified through methods such as interviews with experts and those on the job and protocol analyses (analyzing think-alouds from individuals while they work), as well as observations and analyses of documentation. Those on the job are asked to rank or rate each of the components or skills for its importance for the job itself. For example, in air traffic control, Eissfeldt (1997) identified 21 different cognitive abilities for ATC operations and had ATCs rate them for the level of ability of each required for the job (Eissfeldt's item did not include interpersonal factors though). Not surprisingly, he reported time sharing and selective attention as the cognitive abilities seen as important for ATC operations. In other words, the knowledge, skills, and mental models that underpin expert performance on the job are identified and these provide guidance for selection and training (Redding & Seamster, 1994). A number of organizations now use such an approach, and interpersonal factors are clearly identified. Pian, Kokorian, and Burke (1997), showed "people" skills such as questioning, listening, and directing others to achieve goals as important for helicopter pilots on command. Maschke, Goeters, and Klamm's (1998) job analysis rating from over 140 pilots showed cooperation, communication and decision making as important for efficient cockpit operations. Maschke et al. concluded that the "classical" areas of cognition, psychomotor skills, and personality (especially communication and collaboration) still maintain their relevance, irrespective of the methodology used.

In ATC selection, more attention is now being paid to interpersonal competencies particularly as they relate to performance. Hannan's (1998) research exemplifies this direction. His study was an examination of the characteristics of a number of clusters of trainees (e.g., high probability of success/licensed; high probability of success/failed licence) to determine the major discriminating factors. His results, amongst others, showed a distinctive difference between the above two clusters with the licensed group being more socially confident, more affiliative, in need of other's company, and more inclined to be democratic, taking into

account other's point of view. In discussing case studies, Hannan reported on a successful candidate in the following way: "The overall impression of this person was a likeable, well respected individual who was always conversant and confident in social as well as classroom settings...he was clearly socially competent" (p. 6). Similarly, Schroeder, Broach, and Farmer (1997) stressed the need for personality characteristics that are critical in teamwork for future, more automated ATC operations (See also Bailey, Broach, & Enos, 1997).

Interpersonal Skills and Training

Perhaps one of the major changes in aviation training over the last decade has been greater acceptance of human factors' effects on the industry. Crew resource management (CRM) or Error Management (Helmreich, 1996) has been extensively researched, and the inclusion of non-technical training for pilots has been advised or mandated by many advisory/regulatory authorities in many countries (e.g., International Civil Aviation Organization; FAA; European Joint Aviation Authority). The initial intention of such programs was attitude change in pilots (e.g., Helmreich & Wilhelm, 1991; Schiewe & Moore, 1997).

Helmreich and Wilhelm studied the inter-relationships among motivation to achieve, interpersonal sensitivity and change in attitude to crew operations. Pilots with a profile high on achieving and interpersonal dimensions showed greatest positive changes in attitudes towards command responsibility following CRM training whereas those low on both actually showed a slight decrease in attitudes to command responsibility. That is, training had positive and negative effects but the direction of the effect was somewhat attributable to achieving and interpersonal predispositions of the pilots. Gregorich, Helmreich, Wilhelm, and Chidester (1989) further showed that individuals high on both achieving and interpersonal dimensions were promoted more often than those low on one or both of these dimensions. Certainly these characteristics are indicative of people high in emotional intelligence which Goleman (1995) describes as "a master aptitude, a capacity that profoundly affects all other abilities, either facilitating or interfering with them" (p. 80). Goleman further suggests that for organizations to thrive corporations should invest in boosting their collective emotional intelligence.

More recently the focus has been on attitudes and active practice (with feedback) for training in teamwork in the cockpit, and beyond (Prince & Salas, 1997). For pilots, such practice is often conducted under the guise of Line Oriented Flight Training (LOFT). LOFT scenarios are used to develop pilot skills, and assessment encompasses technical skills, cognitive skills such as prioritising and workload management, and interpersonal skills (Bertram & Dowd, 1997). In a typical LOFT exercise, crews are briefed on the particular crew resource management strategies targeted in the exercise, then they "fly" a simulator in real time and the crew interactions are videotaped. At the end of the flight, the video is replayed and discussion centres on the interpersonal aspects of crew communication and coordination (and other targeted behaviors). LOFT scenarios typically include some event and associated distracters which are designed to divert crew attention from the event that is about to occur or has occurred. Amundson (1995) identified a number of LOFT assessment criteria including the explicit encouragement of participation, seeking information and directing, provides crew self-critique when needed, managing personal and operational conflict, adapting to crew interpersonal differences, and exercising secure authority. In a similar way, Hamman, Seamster, and Edens (1995) reported the interpersonal factors of communication, group climate, crew coordination, and leadership/followership as critical components of LOFT development and evaluation. Many organizations use the NASA/UT Line LOS checklist (Helmreich, Butler, Taggart, & Wilhelm, 1996) for LOFT evaluation, the latest version (Version 4) having over 30 behavioral markers for crew interpersonal effectiveness.

Interpersonal Skills for Cockpit Crew, Cabin Crew and Beyond

Goleman (1997) asserts that the media exposure of the personality of Melburn McBroom highlighted the need to include interpersonal skills training for pilots. McBroom was apparently a domineering boss, with a temper that intimidated those who worked with him. So intimidated were his co-pilots that they were scared to inform McBroom of empty fuel gauges while McBroom obsessed over landing gear. The ensuing crash resulted in ten fatalities. Goleman uses this example to emphasise the dramatic reality check that a plane crash can result in instances of dysfunctional teamwork.

Not surprisingly, the development of interpersonal skills in cabin crew/cockpit crew relations has recently been undertaken by a number of airlines. These airlines have recognised that one of the problems facing interactions

between the two crews is an organizational barrier which has relatively clear hierarchical implications. In order to reduce such barriers, a large European carrier has developed a training program to meet a number of specific targets including encouraging interactive behavior between cabin and cockpit. For all crew, the training emphasises active listening, the development of questioning skills, and expression of requests in an assertive manner (Proske, Foese, & Schiewe, 1997). Naef (1997) reported similar joint training exercises. Where it is not possible to have cabin and cockpit crews together for training in interpersonal skills, other airlines use separate programs in interpersonal skills for cabin and cockpit crews with an emphasis on across the barrier communications (Amundson, 1995).

Karlins, Koh, McCully, and Chan (1997) expanded teamwork beyond the cockpit door to include pilots, cabin crew, station managers, and traffic and ground engineers. Their Operational Areas Seminar in Synergy (OASIS) program is designed to reduce inter-group conflict and enhance inter-group co-operation and teamwork. Evaluation of OASIS showed positive interpersonal outcomes with comments such as, "made me realize I was doing things to cause problems for other staff I wasn't even aware of. Now I know what these things are I can avoid doing them in the future" (p. 328).

Predmore, Mancuso, and Johnson (1997) conducted on-the-job training for ramp personnel working for a large US carrier (Ramp personnel are responsible for ground handling practices and procedures). Their program was designed to increase performance in a number of interpersonal dimensions including listening actively and asking questions when unsure, giving and accepting constructive feedback, and knowing what is expected of each individual in the team. The program encourages ramp personnel to speak up if they see anything which is unsafe, irregular or not in accordance with standard procedures. Predmore et al's report focused on early experiences with the program and no specific results were detailed.

ATC and Training

Because of the increasing need for teamwork competencies in ATC, a number of programs have been developed to increase ATC interpersonal skills. Smith-Jentsch, Zeisig, Cannon-Bowers, and Salas (1997) reported a program designed to provide practice in a number of interpersonal

behavioral skills such as supporting behavior and feedback skills. Indeed, team resource management (TRM) has been developed for ATCs in Europe (Barbarino, 1997) where it is reinforced that TRM is not intended to replace technical training but rather to complement it, a sentiment reflected in CRM training and other interpersonal skill training.

However, amidst this training there has been questioning of the overall effectiveness of changing interpersonal skills. Can all individuals be changed? For how long do the changes maintain themselves? Do individuals revert to their old styles soon after training? Some time ago, Cook (1991) questioned the ways in which CRM training has been conducted, and Hormann and Maschke (1991) signalled the difficulties in changing attitudes, including interpersonal ones, suggesting that more effort may be required to sustain change. Maurino (1997) foregrounds the problems arguing for safety (and its necessary interpersonal dimensions) to be a corporate value and that different sub-cultures within an organization need to be considered in any training. It is perhaps timely to consider whether or not the aviation industry really has a commitment to training interpersonal skills (obviously amongst a range of other skills). We have demonstrated by identifying research that programs are in place, but the longer term effects of such are rarely investigated. "Shots-in-the-arm" followed by "top-ups" are certainly not consistent with current perspectives on training (Telfer & Moore, 1997). There needs to be a cohesion across all levels in an organization from the pilots, to the instructors and check/training captains, to the cabin crew, ramp personnel, maintenance, engineers and so on to management itself. In Cohen's (1987) terms, the system needs to be aligned. If any one component of the system is not committed to, say interpersonal skills development, then it is not likely that worthwhile change will occur. Pilots in a company that ignores CRM (including interpersonal) principles in its management operations may have difficulty in accepting CRM training. Such a situation is akin to "Do as I say" not "Do as I do." In other words, all the players need to see the reasons for and the likely benefits of such training. Maurino (1997) reinforces this point by suggesting that pilots (and others crews) be actively involved in training design rather than simply its implementation. Here, at the macro level, is informed training and ownership, not training that is blind and out of one's control. Research in other educational contexts shows blind training and lack of control as serious impediments to learning (Moore, 1994.).

Management Structure and Interpersonal Dynamics

Integral to the role of interpersonal skills training is the way in which the organization operates. Indeed, Telfer and Moore (1997) suggest that the personality of the organization is an area of organizational climate that is yet to be recognized for its impact in a number of areas in aviation. Though no research into the effects of the organizational climate on training have been done in aviation, Telfer and Moore suggest that such a venture would be fruitful. Further, they suggest that open (indicative of a supportive, high morale, strong leadership and considerate management structure) and closed (indicative of low morale, high emphasis on rules and trivia, close supervision and impersonal management structure) climates would have very different effects on training and selection.

Other researchers also imply that a healthy relationship between the organizational structure and the individuals who work within it, is paramount for effecting changes that are to be positive. Apart from the more obvious factors such as management flexibility reflected in willingness to constantly monitor and reshape the work environment (Westrum, 1995), there are other more complex factors which can contribute to mutually beneficial changes. Most researchers agree that an information flow is essential to creating a productive climate in any organization, where two way communications systems are encouraged - from the top to the bottom, and bottom to the top (Beaumont, 1995; Westrum, 1995). In line with our previous references to attachment theory, Beaumont posits that management needs to effect individuals' attachment to the organization by supporting their active involvement in the decision processes, which means that management gives people a chance to be heard and values their input. By effecting attachment in this way, the individual becomes committed to the organization and contributes to the organization's generativity.

In conclusion, then, it is not merely sufficient to implement interpersonal skills training courses without examining the climate in which those skills are to be used. Open climates where communication among all levels is encouraged are more likely to reap cost effective benefits. As Peter Drucker pointed out, the productivity of workers with highly specialized expertise (such as pilots, ATCs, etc.) depends on those efforts being coordinated as part of an organizational team and "teams become the work unit rather than the individual himself " (Goleman, 1997, p. 149).

Practical Applications

To conclude the paper, a number of practical applications are presented below:

1. Define the climate of the organization - encourage an open climate
2. Take notice of initial interactions between pilots, co-pilots, cabin crew, maintenance crew etc
3. Include interpersonal skills and social intelligence as heavily weighted criteria for selection of personnel
4. Ensure that interpersonal skills training programs include those factors which have been shown to reduce human error, such as frequency of speech, consistent patterns of communication and shared mental models
5. Ensure that those who are undergoing training are attached to the program, they have had some say in what it is about, why it is needed, and maybe even how it might be conducted
6. Ensure that CRM principles are not only in the cockpit and cabin, but permeate the whole organization. ☐

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