

Some cultural considerations for investigators

Peter R Williams¹

Paper presented at the
Australian and New Zealand Societies of Air Safety Investigators, Regional Air
Safety Seminar
Canberra, ACT., 5 June 2010

Introduction

Don't be misled by that title. I have had no formal training in cultural competency, sociology or psychology, and this paper is not a report of a robust academic study. It's just that a couple of recent events prompted me to review some cultural aspects of investigating and I wanted to share that.

The first event was my participation in the Transport Accident Investigation Commission (TAIC) team that assisted the Tongan Royal Commission of Inquiry into the sinking of the Tongan inter-island ferry *Princess Ashika* on 5 August 2009. Readers can get more information from the Royal Commission website (<http://www.rcimvprincessashika.to/>).

You will quickly think of some cultural, probably ethnic, differences between New Zealand (NZ) and Tonga, but there seemed to be other cultural questions that might have had relevance to the investigation. For example:

- We were foreign investigators. Would the Tongans accept our role?
- The whole country was grieving after this disaster. Would Tongans at all levels of society cooperate with us as we examined the disaster in detail?
- English was not the first language of most of the interviewees, and wasn't understood by many. How could we minimise what might be 'lost in translation'?
- We were bound to develop impressions about the country and how its political and commercial mechanisms worked, the state of the infrastructure and so on. Would those impressions influence our fact-finding and formulation of hypotheses? Would mistaken impressions in our report provoke unintended offense, defensiveness or distress?

¹ P.williams@taic.org.nz Transport Accident Investigation Commission,
Wellington, New Zealand.

- The society had a strong hierarchical structure that might affect whether a witness would speak about someone the witness considered of superior status.
- Tonga was a signatory to various maritime standards, but did its status as a developing nation impact on its ability to implement and observe them?

Questions like these were soon answered, and our investigators adapted to the situation and the people without causing any cultural strife that we were aware of.

The second event was a meeting in NZ to discuss that investigation, when I felt some fellow staff members were uneasy about our references to 'cultural' issues that might have been factors in the disaster or have affected the conduct of the investigation itself. The uneasy staff might have interpreted *culture* in its ethnic sense only, unlike the investigation team which had taken a broader view.

As well as immediately trying to correct any misunderstanding about our use of 'culture', the staff at that meeting were given copies of the International Civil Aviation Organisation (ICAO) Human Factors Digest No. 16, *Cross-cultural factors in aviation safety* to illustrate the breadth of the subject in the context of transport safety. However, that second event was what led me to review cross-cultural factors further and to this paper.

Their culture, my culture = cross-cultural differences

There are many definitions of *culture*, often changed to fit an author's purpose, but you will have an understanding of what it means. We don't need another definition or to suggest that one is the best. We hear of corporate culture, safety culture and every other culture: no attempt is made to discuss all of these.

The earliest reference to culture that I found in an ICAO document was in the (still current) 1970 edition of the Manual of Aircraft Accident Investigation in a section, not on human performance, but on accident site safety. We are warned to watch out for 'bacterial cultures' among dangerous goods (ICAO, 1970, p.III-1-4). But now we have to watch out for all sorts of cultures on board and on the ground throughout an investigation.

This paper considers two broad aspects of culture that I think investigators should consider. The first concerns the cultural factors that apply to the subjects of the investigation, us looking at them, which is what we typically think of first. This aspect covers factors like ethnicity, societal structure and cross-cockpit gradient, military-trained versus civil-trained, and the 3 cultures of aviation described by Helmreich – national, organisational and professional (Helmreich, 1998, p.2).

Many references to cultural issues and human factors are written from the point of view of analysing the attitudes and performance of others. There are plenty of

good resources to help us in this area, such as the excellent Australian Transport Safety Bureau (ATSB) human factors training course and the ICAO Human Factors Digests. I think most investigators have a good, perhaps somewhat intuitive, knowledge of this aspect, so it is given less attention in this paper.

The second aspect of culture to consider in investigations is the investigators themselves. How do your subjects see you? How do you relate to them and to the circumstances that you are investigating? It is suggested that the same human factors and cultural factors that you would readily explore with respect to your subjects also apply to you. But who's looking at you? You (and your team, if that is how the investigation is structured) might take the time for some introspection and consider what cultural issues attach to you and whether they will affect the investigation.

This is not a groundless concern. If you don't strike the right relationship with your interviewees, the interviews will not achieve their full potential. If you have a recognisable pre-conception, prejudice or bias, then that conflict has the potential to compromise the investigation. The issue has been raised before by Li *et al* who noted that while culture has been shown to be implicated in accident causation, the effects of national culture were not routinely considered in international accident investigation processes (Li *et al*, 2007b, p.112).

The culture of the subjects

Much of an investigation is devoted to examining the human performance of those directly involved in the occurrence. We seek out the readily identifiable, broad cultural factors and are alert to potential cross-cultural issues – but usually only those that affect the subjects. This would appear to be the case whether the investigation is domestic or international in scope, and is an example of the *Relevance Paradox* at work. The paradox is described as follows:

The relevance paradox occurs because people only seek information that they perceive is relevant to them. However there may be information (in its widest sense, data, perspectives, general truths etc.) that is not perceived as relevant because the information seeker does not already have it, and only becomes relevant when he does have it (Wikipedia, 2010).

This problem is, perhaps, implied in the ISASI *Guidelines on Investigating Human Factors*, which note that 'the dividing line between relevant and irrelevant human factors issues is often blurred' (ISASI, 2009, p.4).²

We might think that culture and human factors should have a close relationship, but the first ICAO Human Factors Digest, *Fundamental human factors*, published in 1989, doesn't mention *culture*. Digest No.2, which was published in the same year and covered flight crew training, has just a few references to organisational

² The ISASI *Guidelines* were adapted, with permission, from the human factors training course of the Transportation Safety Board of Canada.

culture, but also states the following in respect of crew resource management (CRM), (almost a mandatory target in human factors investigations):

Techniques that work well in one culture may not work at all in another. The availability of the personal skills and other resources required by some of the techniques is an obvious consideration. (Note: The term culture is used here in its broadest sense and includes the norms of organizations and their management, ethnic origin, religion, etc.). (ICAO, 1989b, p.14).

Differences between national and organisational cultures adversely affect the applicability of CRM courses that were originally developed according to western norms. Malaysian Airlines found in the late 1980s that the traditional CRM model was inadequate for cross-cultural issues that arose from its hiring of many expatriate pilots (Radzi, 1999). So the airline added a 'culture module' to the course. The airline I flew for in the 1990s had a similar course. Twenty years on, the cultural differences still exist, so it is no surprise that CRM problems still exist, but Boeing's Flight Deck Concept Centre is actively researching a fix (Holder, 2010). The role of culture in accident causation continues to be researched by various groups (for example, Li *et al*, 2007a).

Although it might be easy enough to identify cultural differences and issues that your subjects have, what conclusions can be drawn? If there are factors of importance to your investigation, evaluation of them by an expert is indicated. In the case of an investigation conducted according to all of the provisions of Annex 13, the experts are likely to be from the culture(s) of interest. Note that the ICAO Human Factors Digest No.16 guides us to explain what happened at the cultural interfaces rather than just contrast the cultures themselves (ICAO, 2004, p.2).

Depending on the individual investigator's experience and training, an attempt to assess the organisational and professional cultures of some groups could be buying a fight. You need some assurance that the appropriate yardsticks and norms are being used to evaluate anyone's behaviour and attitudes. Use an expert if in doubt.

If you don't correctly understand the cultural contexts of the occurrence under investigation and the subject's work domain, then interview questions could miss the mark or answers be misunderstood, and consequently the analysis could be wrong and the investigation fail to achieve its intended goal. As Li puts it, 'try to understand the events ... from the viewpoint of the culture of the pilots/airline involved ... and not from the cultural viewpoint of the investigator' (Li *et al*, 2008, p.30).

Two examples that readily come to mind of accidents in which cultural factors involving the subjects were prominent are the Avianca Boeing 707 fuel exhaustion accident near New York in 1990 (National Transportation Safety Board (NTSB), 1991) and the Crossair Saab 340B aircraft that crashed soon after take-off from Zurich airport in 2000 (Federal Department of the Environment, Transport, Energy and Communications, 2002). In the Swiss accident, significant

differences that had a cultural basis were found with the aeroplane instrumentation, the airline's cockpit procedures and CRM practices when compared with the captain's previous training and experiences in Eastern Europe. The Swiss report is recommended reading for its discussion of these factors.

The culture of the investigator

The second broad aspect of culture concerns the investigators themselves and their part in the investigation. Because investigators and subjects each have their respective cultures, we must expect cross-cultural difference and possibly issues. How might you go about the suggested introspection to determine existing biases and other issues that could impact on the investigation?

Language is an obvious cross-cultural difference that can cause us trouble, and might also be a factor in the performance of subjects. The onus is on us English-speakers to ensure that we are understood correctly by interviewees and that we understand their replies correctly. Take your time with interviews, speak slowly and don't use double-negatives. Don't assume that an English speaker is an English thinker or, a worse sin, that a poor English speaker is somehow not too intelligent.

The question of translations is not always resolved to everyone's satisfaction. There is an argument that critical statements or text should be translated forwards and backwards, by different translators, to ensure what was transmitted is what was received. When translating language A into language B, does it make a difference whether A or B is the first language of the translator?

Cross-cultural issues can exist between the subjects and you, even though you might be from the same country or have a similar professional background. Look at how fighter pilots make jokes about transport pilots, and how we all love jokes about lawyers. Many a true word is spoken in jest. Real differences could exist between you and your subjects that you ought to try and identify, because those differences could affect how you get the job done.

If an investigation is in your home country, it is probable that you fit the national culture. You will inevitably investigate an organisation. If you are from that organisation, for example, an airline safety investigator looking at an operational occurrence, you should have a close fit with the organisational culture. However, it has been observed on occasions that operational safety investigators who extend their inquiries into the engineering side of the company can meet with opposition and have difficulty in getting the information they want. A serious cross-cultural issue!

Understanding the professional culture might not be so easy. The distinctions between an old airline pilot and a shiny new general aviation pilot are marked, and an investigator whose professional background is close to that of the subject will likely enjoy more respect and have a more fruitful relationship.

If you are involved in an investigation with international connections, you must expect cultural differences within the team and between the team and the subjects. The way we conduct an investigation - interviewing, analysing and so on - reflects our personal cultures (national and organisational, for example). We must recognise that and allow for inherent biases, and also for the possibility of our being ignorant of important local customs. For example, at a time of mourning, local interviewees might be offended by brightly coloured clothing, or might wish to start formal proceedings with a prayer for the victims.

Recent papers by Wen-Chin Li *et al* have shown there is a cultural basis in how investigators attribute the findings in accident investigations (Li *et al*, 2007b). Also, according to Li, safety recommendations should be framed so that they are congruent with the operator's cultural domains (Li *et al*, 2008). To not do so, risks the safety recommendations being misunderstood, ineffective, and even resented.

One might expect that problems like those above would be avoided or minimised in an Annex 13 investigation because of the expert help present in the form of accredited representatives and their advisers. Whether that happens will be dependent on the management skills of the investigator in charge.

The ICAO Manual of Aircraft Accident and Incident Investigation also cautions:

As occurrence factors become increasingly remote from the immediate time and place of the accident, the potential subjectivity of the investigation increases, as do the opportunities for disagreement between those with a stake in the investigation. This is not, however, justification for avoiding controversial organizational and systemic issues.

It should also be borne in mind that several organizations may be implicated in an accident, each with their own level of involvement. The organizational factors relating to each of these organizations should be considered separately.

In most cultures, there is a strong tendency to search for culpable individuals after an accident and a corresponding reluctance to consider the role institutions such as companies or government organizations may play. The organizational investigator must resist such pressures, yet still consider how an effective organizational investigation can be conducted consistent with the [investigator's] national culture. (ICAO, n.d., p.III-3-7).

A short paper by Merritt, written from the perspective of a human factors consultant, provides some insights that investigators might find useful. You know that you have to understand the client before you can work effectively for them, but there is never enough time to get the level of understanding you would like (Merritt, 1999, in Hayward & Lowe, 2000, p.135). Merritt lists 11 possible approaches for addressing cultural differences, ranging from the unacceptable denial of any differences through to approaches that explicitly acknowledge differences and objectively work through them. We are likely to agree with Merritt's advice to not make culture the explanation or scapegoat for everything that is found to be different, nor to overstate its importance.

Case study: analytical difference or cultural difference?

Just how important is it to have a good understanding of cross-cultural differences? The fall-out from the investigation of the Egyptair Boeing 767 plunge into the Atlantic Ocean in 1999 gives an answer.

Shortly after the aeroplane reached initial cruise altitude on a flight from New York to Cairo, the captain left the flight deck to go the toilet and soon afterwards the aeroplane entered a steep dive. The NTSB found the probable cause was collision with the ocean 'as a result of the relief first officer's flight control inputs. The reason for the relief first officer's actions was not determined' (NTSB, 2002, p.67). Although suicidal action was not mentioned, it was clearly intimated. However, Egyptian media and commentators defended the first officer and offered counter-theories for the accident, including a mechanical failure in the elevator system.

In a lengthy article on the accident in the November 2001 issue of *Atlantic Monthly*, before the NTSB final report was published, William Langewiesche³ wrote:

Two years afterward, the U.S. and Egyptian governments are still quarreling over the cause—a clash that grows out of cultural division, not factual uncertainty ...

In essence the Egyptians were making two intertwined arguments: first, that it was culturally impossible for [first officer] Batouti to have done what the NTSB believed; second, that the NTSB lacked the cultural sensitivity to understand what was on the cockpit voice recorder (Langeweische, 2001).

The Egyptians employed an American airline pilot to help their cause against the NTSB, but, according to the American pilot, the Egyptians didn't listen to him. It was alleged, ironically, that the pilot disclosed his own lack of cultural insight by suggesting the NTSB and Egyptians 'kiss and make up'.

The article reported that one of the leaders of the Egyptian delegation had claimed: '[Then NTSB Chairman] Jim Hall told me, "I've learned a very good lesson. When you deal with a foreign carrier in an investigation, before you go anywhere with it, you have to study the history and culture of the country." These were his own words to me! He said, "I knew nothing about Egypt or its culture before we got into EgyptAir 990."'

The *Atlantic Monthly* article claimed that although several Arabic-English speakers assisted with the transcription and translation of the cockpit voice recording, none of those persons was Egyptian. Cockpit voice recordings are rich in their potential for professional differences between investigators and subjects, and care for the correct understanding of dialects is a valid concern.

³ In 2010, Langewiesche wrote *Fly by wire: the geese, the glide, the miracle on the Hudson*, a critical account of the Airbus A320 ditching in 2009. His father wrote a well-known book on flying techniques, *Stick and rudder*.

An inability to achieve a satisfactory mutual agreement as to the causes of an accident can raise doubts as to the validity of the findings and the value of any safety recommendations. It seems clear that the USA-Egypt rift had some roots in cultural misunderstandings. In rejecting the NTSB draft report, Egypt appended its own conclusions and findings and protested:

Pursuant to section 5.3 of Annex 13, it was anticipated that the investigation would be conducted as a partnership between equals. However, it soon became apparent that the NTSB leadership did not regard the Egyptian delegation as an equal partner and shared its processes, if at all, on a selective and seemingly random basis (NTSB, 2002, p.150).

What is available to guide investigators?

All of TAIC's investigators have attended the ATSB's popular and excellent human factors training course, but that course scarcely mentioned culture, although the sections on human performance imply consideration of a wide range of cultural factors. Other than that, we (in TAIC) would employ an appropriately experienced psychologist if the known circumstances or factors indicated that was needed. Interestingly, our human factors checklist has only one question directly related to culture: 'What is the crew member's cultural, ethnic, religious and familial background and did this influence their behaviour?' One question, but one which would likely have a multitude of answers.

The ATSB also provides its investigators with training in general cross-cultural awareness, conducted by an external expert, UGM Consulting. UGM have also provided cultural briefings for ATSB investigators who are to be involved in collaborative international programmes. UGM are given a plug here, because their website contains some useful guidance: www.ugmconsulting.com.

The NTSB relies on US embassies to provide a cultural briefing if one is necessary in another country (Hilldrup, 2010). Similar assistance should be available from your Ministry or Department of Foreign Affairs. However, it would seem to be good practice to have a general appreciation of cross-cultural factors 'up your sleeve' and to know where to get specific information before setting off on an investigation. An internet search is an obvious tool: a useful summary of each nation's vital statistics (from a distinctly US perspective) is The World Factbook published by the Central Intelligence Agency at www.cia.gov/library/publications/the-world-factbook/.

You ought to be familiar with the series of ICAO Human Factors Digests, but they are of variable use when it comes to advice on *culture*. Digest No. 7, *Investigation of human factors in accidents and incidents*, (ICAO, 1993a), hardly mentions *culture*, but Digest No. 10, *Human factors, management and organisation*, published the same year, emphasises corporate culture and safety culture (ICAO, 1993b). Digest No.16, *Cross-cultural factors in aviation safety*, is targeted at safety and investigation agencies and others. Note, however, that all of these publications consider the subjects' culture.

Cultural self-preparation for an investigation

Edward's SHELL model, as modified by Hawkins, is suggested as framework for a stock-take of one's cultural position prior to an investigation (Hawkins, 1993, p.22). This might be done as you travel to the site. Imagine yourself as the central Liveware block and appraise each interface. You might identify possible short-falls in investigative capability. Another review during the investigation would benefit from what you have learnt so far. Such self-reviews have the advantages of being proactive, quick and easy, and they demonstrate your willingness to deal with cross-cultural factors.

What you come up with during that exercise in introspection will be highly contextual; it will depend on you and the occurrence at hand. If you identify a possible conflict, record that somewhere and assess its potential impact on the investigation. If necessary, discuss the situation with appropriate others, who could even be some of the subjects. For example, you might have had a long acquaintance with a manager in the subject's organisation, but the subject might be comfortable with that and trust your impartiality. It would be sensible to have the acceptance recorded formally.

Some examples follow of the sort of questions you might ask yourself. You, too, will find it easier to think of examples at the liveware - liveware interface than for the other interfaces.

Liveware - Liveware

Next-of-kin: Use the police where appropriate. Express condolences. How to gain their confidence and support for the investigation.

Witnesses: Learn the local customs for making introductions, observing personal space, and the expected conduct at occasions such as this. What dress standard. Language (and maybe) translation issues, manner and rate of speech. What level of technical knowledge to expect from witnesses.

Operator: Previous investigations. Respect for law and standards. Industry standing.

Other investigators: Different cultures and expertise. Rules for the investigation.

Liveware - Hardware

Am I sufficiently familiar with the occurrence aircraft type and its equipment. Which specialists should I call for now or anticipate requiring.

Liveware - Software

Do I have the skills necessary to investigate the likely technical, commercial, or regulatory aspects. Do I need specialist analytical tools. Do I know what I don't know.

Liveware - Environment

What might I need to be safe in the physical environment. What do I know about this country, this company and its standing in the industry. How best to learn about their values.

Conclusion: develop your cultural intelligence

The purpose of this paper was to extend our understanding of cultural issues that we might face as investigators. The investigation of cultural and cross-cultural factors affecting the subjects of an investigation has been practised for a long time, but there has been little recognition of the cross-cultural issues that will be present between investigators and those they are investigating. If investigators understood this second cultural aspect that involves them, and performed some cultural preparation beforehand, they could improve the quality of all phases of an investigation.

Formal training can help in developing one's 'cultural intelligence', but DIY has its place too. The following suggestions are offered:

- Know yourself: be honest and realistic about your culture, attitudes, knowledge and skills
- Aim to respect all people and cultures: respectful handling of any differences should follow.
- Have a good base of general cultural knowledge and then build on it. Get in the habit of periodic reading of academic papers to broaden your knowledge of this topic.
- Put in some cultural preparation, such as a SHELL self-review, before every investigation.

A good investigator will look for any cross-cultural issues associated with an investigation and deal with them so that any potential adverse effect is minimised. That requires you to know yourself first of all, and to respect all of those you deal with, both in the investigation team and your subjects. After gathering the facts, the processes for analysis and drafting of safety recommendations must be alert for further cultural biases. The review of the draft report provides an opportunity for subjects and others to correct any cultural misunderstandings before publication.

A quote in Merritt's article, taken from a 1973 book by Clifford Geertz⁴, summed up how I felt after preparing this paper (Merritt, 1999, p.131):

[Cultural analysis] is a strange science ... in which to get somewhere with the matter at hand is to intensify the suspicion, both your own and that of others, that you are not quite getting it right.

⁴ US social anthropologist (1926-2006) noted for his work on the role of symbols in public meaning.

I'm sure I have not got it quite right either, but if these notes help us to do it better, I'll be pleased.

Bibliography

The references marked with * are recommended to help broaden your understanding of the subject.

*Dekker, S. (2006). *The field guide to understanding human error*. Aldershot, England: Ashgate.

*Federal Department of the Environment, Transport, Energy and Communications. (2002). *Accident to the Saab 340B aircraft, registration HB-AKK of Crossair, flight CRX 498, on 10 January 2000, near Nassenwil/ZH*. (Report 1781). Berne. Retrieved 5 May 2010 from <http://www.skybrary.aero/bookshelf/books/530.pdf>.

Hawkins, F.H. (1993). 2nd ed. Orlady, H.W., Ed. *Human factors in flight*. Aldershot, England: Ashgate.

Helmreich, R.L. (1998). *Building safety on the three cultures of aviation*. In *Proceedings of the IATA human factors seminar (pp.39-43)*. Bangkok, Thailand, 12 August 1998.

Hilldrup, F. (2010). Personal communication, NTSB investigator, 20 March 2010.

Holder, B.E. (2010). Personal communication, Boeing lead scientist, 2 February 2010.

ICAO. (1970). *Manual of aircraft accident investigation*, 4th ed. (Doc 6920-AN/855/4). Montreal.

*ICAO. (1989a). Human factors digest No.1, *Fundamental human factors concepts*. (Circular 216-AN/131). Montreal.

ICAO. (1989b). Human factors digest No.2, *Flight crew training: cockpit resource management (CRM) and line-oriented flight training (LOFT)*. (Circular 217-AN/132). Montreal.

*ICAO. (1993a). Human factors digest No.7, *Investigation of human factors in accidents and incidents*. (Circular 240-AN/144). Montreal.

*ICAO. (1993b). Human factors digest No.10, *Human factors, management and organization*. (Circular 247-AN/148). Montreal.

*ICAO. (2004). Human factors digest No. 16, *Cross-cultural factors in aviation safety*. (Circular 302-AN/175). Montreal.

ICAO.(n.d.). *Manual of aircraft accident and incident investigation*. (Doc 9756-AN/965, Part III, interim ed.). Retrieved 5 May 2010 from http://www.icao.int/cgi/inet_file.pl.

ISASI. (2009). ISASI Guidelines for Investigation of Human Factors in Accidents or Incidents.

Langewiesche, W. (2001). *The crash of EgyptAir 990*. Retrieved 24 March 2010 from <http://www.theatlantic.com/past/issues/2001/11/langewiesche.htm>

Li, Wen-Chin, Harris, D. & Chen, A. (2007a). *Eastern minds in western cockpits: meta-analysis of human factors in mishaps from three nations*. In *Aviation, space, and environment medicine, Vol.78, No.4, Section 1, April 2007*.

Li, Wen-Chin, Young, Hong-Tsu, Wang, T. & Harris, D. (2007b). *International cooperation and challenges: understanding cross-cultural issues*. In *ISASI 2007 Proceedings, pp. 110-114*.

Li, Wen-Chin, Young, Hong-Tsu, Wang, T. & Harris, D. (2008). *Approaches to accident investigation by investigators from different cultures*. In *ISASI 2008 Proceedings, pp. 26-31*.

*Merritt, A.C. (1999). *The trouble with culture*, in Hayward, B.J. & Lowe, A.R.,Eds. (2000). *Aviation Resource Management*, vol. 1, pp.131-138. Aldershot, England: Ashgate.

National Transportation Safety Board. (1991). *Aircraft Accident Report, Avianca, Boeing 707-321B, HK 2016, fuel exhaustion, Cove Neck, New York, January 25, 1990*.(Report NTSB/AAR-9 I/04, PB91-910404). Retrieved 24 March 2010 from <http://libraryonline.erau.edu/online-full-text/ntsb/aircraft-accident-reports/AAR91-04.pdf>.

National Transportation Safety Board. (2002). *Aircraft Accident Brief, EgyptAir Flight 990, Boeing 767-366ER, SU-GAP, 60 miles south of Nantucket, Massachusetts, October 31, 1999*. (Report NTSB/AAB-02/01, DCA00MA006). Retrieved 24 March 2010 from <http://www.nts.gov/Publictn/2002/aab0201.htm>.

Radzi,A. (1999). *Western expatriates in an eastern organisation: a Malaysian Airlines experience*, in Hayward B.J.& Lowe, A.R., Eds. (2000). *Aviation Resource Management*, vol. 1, pp.121-129. Aldershot, England: Ashgate.

Wikipedia. (2010). *Relevance paradox*. Retrieved 9 May 2010 from http://en.wikipedia.org/wiki/Relevance_paradox.