



IEEE Aerospace Conference Proceedings and Its Impact on the Aerospace Scientists and Engineers of Bangalore

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ABSTRACT: A research survey was undertaken to ascertain the 'Frequency of Usage of IEEE Aerospace Conference Proceedings' amongst the aerospace scientists and engineers of 16 aerospace organizations of Bangalore. The major findings of this study are: (a) *Analysis of Variance (ANOVA)* was applied for testing the significant difference among the 16 mean scores attained from the scientists and engineers of the aerospace organizations for 'Frequency of Usage of IEEE Aerospace Conference Proceedings'. It is observed that all the 16 aerospace organizations show a significant difference ($P < 0.05$) in their mean scores viz., '2006 – IEEE', '2005 – IEEE', '2004 – IEEE', '2003 – IEEE', '2002 – IEEE', '2001 – IEEE', '2000 – IEEE', '1999 – IEEE', '1998 – IEEE' and '1997 – IEEE' except for '2007 – IEEE ($P = 0.057$)'.

KEYWORDS: Patterns of Use, Aerospace Scientists and Engineers, IEEE Aerospace Conference Proceeding, City of Bangalore.

I. INTRODUCTION

Conference proceedings are the collection of academic papers that are published in the context of an academic conference. They are generally distributed as printed books or sometimes CDs. These proceedings contain the contributions made by researchers at the conference. They are written records of the work that is presented to fellow researchers. Aerospace scientists and engineers refer to a wide variety of conference proceedings, one of the most popular being the IEEE Aerospace Conference Proceedings.

Aerospace scientists and engineers use various types of formal and informal channels to satisfy their information and communication needs. Engineers satisfy most of their information and communication needs from their fellow colleagues, various design handbooks, internal technical reports and for seeing what is happening outside, they look at conference proceedings and also attending many conferences related to their field. They do consider conferences as one of their primary source of information in gathering information about new research that is happening in their field. For the scientists, it is seen that, scientific journals and conferences recognized in the subject field were more often used by them, especially those who were working towards scientific recognition in the form of publications. Also, they heavily depend upon attending conferences for keeping up-to-date.

II. REVIEW OF LITERATURE

Tenopir and King (2004) studied the communication patterns of engineers and the information resources used to perform their work. Their conclusions reveal that engineers rely on both interpersonal and informal means of communication more than scientists, who read journals more frequently and are more inclined to use other formal means of communication as well. They found that engineers engage in many types of activity including research, design, development, production, construction, teaching, management, and marketing. As a result, they use numerous formal and informal channels to satisfy their communication and information needs. There are many written publication types which may be important to engineers, including scholarly and trade journals, books, internal and



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external reports, patent documents, conference proceedings, standards, regulations, dissertations. Sridhar (1988), in a study conducted on the formal sources of information requirements of the Space Technologists points out that: there is heavy dependence on journals, followed by books, reports, trade literature and internal reports (in that order). Conference proceedings, reprints and preprints, standards and patent specifications and theses, and dissertations have ranked lowest amongst the space technologists. In a study by Guruprasad et al., (2011), it was found that as far as extent of usage of e-resources among the Indian Aerospace Scientists and Engineers were concerned, 'e-journals: (Mean=2.45, CV=55.51)', 'e-books: (Mean=2.35, CV=55.32)', 'e-technical reports: (Mean=2.13, CV=61.50)', 'e-databases: (Mean=2.02, CV=62.87)', 'e-computer programs: (Mean=1.83, CV=75.40)', 'e-conference proceedings: (Mean=1.82, CV=77.140)', 'e-specifications: (Mean=1.75, CV=77.14)' and, finally, 'e-drawings: (Mean=1.55, CV=85.81)'. Hertzum and Pejtersen (2000), opine that, Engineers get most of their information from colleagues and internal reports. Another important supplement in obtaining external information is to attend conferences. "Despite our efforts we miss a lot in the searches. That's one of the opportunities you get at conferences. You get to talk to somebody who has been doing something similar and has a report you can have. I have received a few things that way. Things we hadn't found ourselves." Also, engineers who have been working within the same area for an extended period of time and that they have little need for searches, it was seen that their information seeking consists primarily in keeping abreast within a known area. They accomplish that by leafing through relevant journals and proceedings, and generally rely on conferences as their primary source of information about new research results. By relying on work group colleagues and conferences the engineers display a strong preference for obtaining new information from people, with documents as an important, but usually concomitant, source. In a study on accessibility and use of information resources amongst scientists and engineers, Hammershlag and Yitzhaki (2004), it was observed that, printed professional journals as well as printed and electronic conference or meeting papers were consistently more accessible and more often used by the academy group, while the industry group reported greater access to and more frequent use of electronic textbooks and trade or promotional literature. In another interesting study by Pinelli (1991) and Leckie, et al., (1996), the authors have pointed out that there are two information channels used by the engineers: the formal information system, which includes information products (such as a conference or a journal) and information storage and retrieval systems, and the informal or collegial network, characterized by interpersonal communications (conversation, oral or written) with peers, colleagues, and supervisors, and by personal collections of information. Nicholas and Jamali (2008) in their study, highlight the fact that, those with higher academic status such as professors relied more on word of mouth and inter-personal communications such as conferences such as conferences for keeping up-to-date, while Ph.D. students were more likely to use alerting services. Also, a range of different methods were used for keeping up-to-date. The most popular methods turned out to be interpersonal communication methods. Word of mouth and colleagues, browsing e-journals, searching, conferences, and meetings were the methods on which, respectively, 93, 85, 83, 78 and 69 per cent of respondents were very or quite dependent. Their study also revealed that, Physicists and Astronomers who were involved in instrumentation kind of research relied on conferences more than anything else; half of them chose conferences as their top used method. Also, respondents from the Optical Science Lab relied a great deal on conferences (about two-thirds). Also, for the Physicists, attending conferences and receiving table of contents e-mail alerts were the two main methods on which they relied for keeping up-to-date.

All these studies strongly indicate that the scientists and engineers use numerous formal and informal channels to satisfy their communication and information needs. For the engineers, an important supplement in obtaining external information is by attending conferences. Also, engineers generally rely on conferences as their primary source of information about new research results. As far as scientists were concerned, scientific journals and conferences recognized in the subject field were more often used by the scientists, who were working towards scientific recognition in the form of publications. These studies also substantiate the fact scientists and engineers involved in research relied upon conferences heavily and many of them even chose conferences as their top used method and also it greatly aided them in keeping up-to-date in their R&D.

III. THE SCOPE AND OBJECTIVE OF THE PRESENT STUDY

The scope of this study restricted to the geographical boundary of Bangalore and the 16 eminent Indian aerospace organizations indicated as Key in Table 1. The main objective of this study are to: (a) to determine the 'Frequency of Usage of IEEE Aerospace Conference Proceedings' amongst the aerospace scientists and engineers of Bangalore, (b) To ascertain whether the percentage of preference of the 'Frequency of Usage of IEEE Aerospace Conference Proceedings' by the aerospace engineers and scientists are approximately the same, and, (c) To study

International Journal of Advanced Research in Science, Engineering and Technology

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whether there exists similar patterns (homogeneity) in their ‘Use Patterns’ amongst the aerospace scientists and engineers of Bangalore.

IV. MATERIALS AND METHODS

A total number of 650 survey questionnaires were distributed amongst the aerospace scientists and engineers belonging to these 16 aerospace organizations. A total number of 612 questionnaires were received back finally 583 (89.7%) were selected which were found suitable for the study. The total population size of this research study is restricted to 1220. The distribution of Source Data is indicated in *Table 1*. Random sampling technique has been used for selection of the sample size.

Table. 1. Distribution of Source Data (Sample Size)

Sl.No.	Organizations	No. of Questionnaires distributed	No. of Questionnaires received	No. of usable questionnaires usable
1.	ADA	67	63	58
2.	AFTC	19	16	15
3.	ADE	14	12	12
4.	ASTE	33	30	29
5.	CABS	16	15	14
6.	CEMILAC	33	30	29
7.	C-MMACS	8	6	6
8.	DARE	11	9	9
9.	LRDE	5	3	2
10.	GTRE	24	22	21
11.	HAL	144	140	134
12.	IAM	40	36	33
13.	ISRO-ISTRAC	25	24	22
14.	IISc	38	37	34
15.	JNCASR	5	3	1
16.	NAL	168	166	164
Total		650	612	583 (89.7%)

Key: ADA=Aeronautical Development Agency, AFTC=Air Force Technical College, ADE=Aeronautical Development Establishment, ASTE=Aircraft Systems Testing Establishment, CABS=Centre for Airborne Systems, CEMILAC=Centre for Military Airworthiness and Certification, C-MMACS=Centre for Mathematical Modeling and Computer Simulation, DARE=Defense Avionics Research Establishment, LRDE=Electronics and Radar Development Establishment, GTRE=Gas Turbine Research Establishment, HAL=Hindustan Aeronautics Limited, IAM=Institute of Aerospace Medicine, ISRO-ISTRAC=Indian Space Research Organization, IISc=Indian Institute of Science, JNCASR=Jawaharlal Nehru Centre for Advanced Scientific Research, NAL=National Aerospace Laboratories.

Table 2. Frequency of Usage of IEEE Aerospace Conference Proceedings on your Research Work

4 – daily, 3 – weekly, 2 – fortnightly, 1 – monthly, 0 - Never					
Name of the Conference Proceeding / Year	4	3	2	1	0
(1) Aerospace Conference, 2007 IEEE	4	3	2	1	0
(2) Aerospace Conference, 2006 IEEE	4	3	2	1	0
(3) Aerospace Conference, 2005 IEEE	4	3	2	1	0
(4) Aerospace Conference, 2004. Proceedings. 2004 IEEE	4	3	2	1	0
(5) Aerospace Conference, 2003. Proceedings. 2003 IEEE	4	3	2	1	0
(6) Aerospace Conference, 2002. Proceedings. 2002 IEEE. (9-16 March, 2002 / Volumes: 1 to 7).	4	3	2	1	0

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(7) Aerospace Conference, 2001. IEEE Proceedings	4	3	2	1	0
(8) Aerospace Conference Proceedings, 2000 IEEE	4	3	2	1	0
(9) Aerospace Conference, 1999. Proceedings. 1999 IEEE	4	3	2	1	0
(10) Aerospace Conference, 1998. Proceedings., IEEE	4	3	2	1	0
(11) Aerospace Conference 1997. Proceedings., IEEE	4	3	2	1	0
Graded on a Scale of 0 to 4 with 0 indicating Never and 4 indicating Daily.					

Table 3. Frequency of Usage of IEEE Conference Proceedings

S N	Organ ization s	Me an and CV	Frequency of Usage										
			2007 IEEE	2006 IEEE	2005 IEEE	2004 IEEE	2003 IEEE	2002 IEEE	2001 IEEE	2000 IEEE	1999 IEEE	1998 IEEE	1997 IEEE
1	ADA	Me an	0.53	0.57	0.47	0.43	0.38	0.40	0.40	0.33	0.38	0.38	0.41
		CV	157.57	158.27	189.66	194.89	196.47	216.15	231.12	238.44	225.37	219.90	235.37
2	AFTC	Me an	0.73	0.53	0.67	0.47	0.47	0.47	0.67	0.33	0.27	0.33	0.40
		CV	140.84	139.35	156.98	178.67	196.17	178.67	156.98	217.12	222.61	217.12	227.56
3	ADE	Me an	0.67	0.67	0.58	0.83	0.75	0.50	0.67	0.50	0.58	0.50	0.83
		CV	133.14	97.70	114.61	123.58	128.71	180.91	147.71	233.55	212.59	233.55	152.08
4	ASTE	Me an	0.21	0.17	0.21	0.07	0.10	0.00	0.03	0.03	0.00	0.03	0.03
		CV	299.60	349.00	299.60	373.93	395.61	0.00	538.52	538.52	0.00	538.52	538.52
5	CABS	Me an	0.43	0.43	0.36	0.29	0.29	0.29	0.21	0.14	0.14	0.07	0.07
		CV	198.71	198.71	177.33	213.94	213.94	213.94	270.17	254.20	254.20	374.17	374.17
6	CEMI LAC	Me an	0.66	0.45	0.48	0.79	0.48	0.34	0.48	0.31	0.48	0.24	0.41
		CV	192.53	227.70	211.68	166.39	238.89	260.26	218.80	311.73	225.70	263.30	228.51
7	C- MMA CS	Me an	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
		CV	244.95	244.95	244.95	244.95	244.95	244.95	244.95	244.95	244.95	244.95	244.95
8	DARE	Me an	1.22	1.56	1.56	1.44	1.00	1.56	1.44	1.33	1.22	1.78	2.00
		CV	98.33	97.02	91.54	85.57	132.29	102.21	98.58	99.22	98.33	67.60	61.24
9	LRDE	Me an	2.00	2.00	2.00	2.00	2.00	2.00	2.00	1.50	1.50	1.50	1.50
		CV	70.71	70.71	70.71	70.71	70.71	70.71	70.71	47.14	47.14	47.14	47.14
10	GTRE	Me an	0.76	0.76	0.71	0.76	0.67	0.62	0.62	0.57	0.71	0.71	0.57
		CV	149.10	160.24	154.27	160.24	166.58	173.05	165.34	188.25	188.57	188.57	179.93
11	HAL	Me an	0.39	0.31	0.35	0.34	0.34	0.34	0.31	0.32	0.34	0.36	0.35
		CV	221.00	245.64	229.95	236.49	230.78	234.53	263.67	255.21	255.46	240.62	252.74
12	IAM	Me an	0.33	0.18	0.21	0.24	0.24	0.30	0.24	0.21	0.15	0.27	0.21
		CV	277.26	290.20	348.78	273.43	273.43	240.31	309.90	282.80	291.50	307.77	282.80
13	ISRO- ISTR AC	Me an	0.50	0.45	0.45	0.41	0.27	0.23	0.23	0.32	0.32	0.32	0.32
		CV	160.36	162.48	162.48	179.46	167.14	188.73	188.73	178.48	178.48	178.48	178.48

S N	Organ ization s	Me an and CV	Frequency of Usage										
			2007 IEEE	2006 IEEE	2005 IEEE	2004 IEEE	2003 IEEE	2002 IEEE	2001 IEEE	2000 IEEE	1999 IEEE	1998 IEEE	1997 IEEE
14	IISc	Me an	0.62	0.59	0.62	0.50	0.50	0.53	0.47	0.41	0.41	0.41	0.41
		CV	182.72	187.71	182.72	185.86	204.49	193.05	190.32	199.35	199.35	199.35	199.35
15	JNCA SR	Me an	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		CV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	NAL	Me an	0.43	0.43	0.38	0.35	0.31	0.31	0.26	0.26	0.25	0.24	0.30
		CV	179.34	185.44	190.52	214.14	212.44	206.38	218.96	242.19	244.20	250.25	223.00
Mean Scores of Frequency of Usage of Aerospace Conference Proceedings		Me an	0.48	0.44	0.43	0.42	0.37	0.36	0.35	0.32	0.33	0.33	0.36
		CV	187.28	195.20	198.29	205.51	215.29	218.94	228.06	241.44	240.87	237.48	227.67
P Values			0.057	0.001	0.002	0.000	0.019	0.000	0.000	0.008	0.003	0.000	0.000

V. RESULTS AND DISCUSSION

The summary of total scores obtained with regard to ‘Frequency of Usage of IEEE Aerospace Conference Proceedings’ is as follows: The summary of total scores obtained with regard to the frequency of the following IEEE Aerospace Conference Proceedings generates the following mean scoring pattern. The highest mean score of 0.48(CV=187.28) is accrued by the respondents of ‘2007 – IEEE’. This is followed by the respondents of ‘2006 – IEEE’ with a mean score of 0.44(CV=195.20). The third largest number of respondents scoring a mean value of 0.43(CV=198.29) is represented by ‘2005 – IEEE’. This is followed by ‘2004 – IEEE’ with a mean score of 0.42(CV=205.51). ‘2003 – IEEE’ represents itself with a mean score of 0.37(CV=215.29). Similar mean scores of 0.36 each are accrued by the respondents of ‘1997 – IEEE’(CV=277.67) and ‘2002 – IEEE’(CV=218.94) respectively. This is followed by the respondents of ‘2001 – IEEE’ with a mean score of 0.35(CV=228.06). Again, very similar mean scores of 0.33 each is accrued by the respondents of ‘1999 – IEEE’(CV=240.87) and ‘1998 – IEEE’(CV=237.48) respectively. The lowest mean score of 0.32(CV=241.44) is accrued by the respondents of ‘2000 – IEEE’.

VI. CONCLUSIONS

The main conclusions from this study are:

- **Analysis of Variance (ANOVA)** was applied for testing the significant difference among the 16 mean scores attained from the scientists and engineers of the aerospace organizations for ‘Frequency of Usage of IEEE Aerospace Conference Proceedings’. It is observed that all the 16 aerospace organizations show a significant difference ($P < 0.05$) in their mean scores viz., ‘2006 – IEEE’, ‘2005 – IEEE’, ‘2004 - IEEE’, ‘2003 – IEEE’, ‘2002 – IEEE’, ‘2001 – IEEE’, ‘2000 – IEEE’, ‘1999 – IEEE’, ‘1998 – IEEE’ and ‘1997 – IEEE’ **except for ‘2007 – IEEE (P = 0.057)’**.
- Implies that the percentage of preference of ‘Frequency of Usage of IEEE Aerospace Conference Proceedings’ by the aerospace engineers and scientists are not approximately the same, **except for ‘2007 – IEEE’**.
- Also, it is seen that there is heterogeneity in their Use Patterns, **except for ‘2007 – IEEE’** amongst the aerospace scientists and engineers of the selected 16 aerospace organizations

International Journal of Advanced Research in Science, Engineering and Technology

Vol. 1, Issue 2, September 2014

VI. ACKNOWLEDGEMENTS

The authors are thankful to Director, NAL and Head, KTMD for the support.

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BIOGRAPHY



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