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A CROSS-ASSOCIATION ANALYSIS OF SCIENTIFIC DESIGNATIONS (GRADES) WITH THE 'USE PATTERNS OF SCIENTIFIC WEB SITES' AND THE 'MOST PREFERRED FILE FORMATS FOR E-JOURNAL DOWNLOADS' AMONGST THE AEROSPACE SCIENTISTS AND ENGINEERS OF BANGALORE

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ABSTRACT
A large number of Scientific Web Sites are frequently referred by the aerospace scientists and engineers of Bangalore. These scientists and engineers also frequently download e-journal full-text articles. A research survey was undertaken to ascertain the 'U' Patterns of Scientific Web Sites and Most Preferred File Formats for e-Journal Downloads' amongst these aerospace scientists and engineers of the selected 16 aerospace organizations of Bangalore. The study is restricted to the geographic boundary of the city of Bangalore. Out of the 650 survey questionnaires distributed to the scientists and engineers, a total number of 612 were received back and finally 583 responses found suitable for the study. The total percentage of responses usable from all the 16 aerospace organizations amounted to 89.7 percent. The analysis is based on the responses received from the aerospace scientists and engineers representing these selected aerospace organizations. The major findings that the authors would like to report in this paper are: (a) The $\chi 2$ test indicates that the different grades (designations) of the Aerospace Scientists and Engineers (Chi-Square = 168.068, P Value = 0.000) by the 'Frequency of Use of Scientific Web Sites' have significant association. (b) Also, The $\chi 2$ test indicates that the different grades (designations) of the Aerospace Scientists and Engineers by the 'Most Preferred File Format for Full-Text Downloads for PDF'(Chi-Square = 181.284, P = 0.011), 'HTML'(Chi-Square = 174.988, P = 0.024), 'MS-Word(Chi-Square = 171.326, P = 0.037)', 'RTF(Chi-Square = 189.748, P = 0.003)' and for 'OCR (Chi-Square = 181.266, P = 0.011) have significant association.

KEYWORDS: Aerospace Scientists and Engineers, Electronic Information Resources, Cross-Association Analysis, Aerospace Organizations, Scientific Websites, Preferred File Formats.

INTRODUCTION

Aerospace engineering is the application of advanced science and technology for the design and development of flight vehicles. These include aircraft, spacecraft, missiles and rockets. An aerospace engineer develops new technologies for control, navigation and propulsion that will lead to future milestones in the history of flight. Originally called aeronautical engineering dealing solely with aircraft, the broader term "aerospace engineering" has replaced the former in most usage, as flight technology advanced to include craft operating outside the earth's atmosphere. In analogy with "aeronautical engineering", the branch is sometimes referred to as astronautical engineering, although this term usually only concerns craft which operate in outer space. In this information explosion age, it is practically impossible for an aerospace scientist or engineer to carry out his research work without embracing the network and Internet technologies. They greatly depend upon these electronic innovation tools for accessing electronic information resources in the form of e-journals related to aerospace engineering right at their desktops. In fact, many of the scientists in today's R&D organizations have the unique privilege of downloading full-text e-journals right at their desktops through their Organization's e-Conglomerate.

It is absolutely clear that the use of electronic media to support scientific communication has undoubtedly been one of the paradigm shifts in the practice of science in this era. For a research scientist today, with access to the Internet, working across continents and in different time zones and keeping in touch with his peers has indeed become a reality due to the exponential growth of the telecommunication infrastructure that the world has witnessed. Most surprisingly, all this happens with very marginal costs of communication.

With the coming of e-resources, there has been a significant transformation by which scholarly information is disseminated throughout the world. In fact, the arrival of e-journals has greatly affected the way a scientist or an engineer seeks this information, acquires it and then uses it effectively. With this radical shift in scholarly research, it is

not surprising that the role of the librarian as an 'information provider' has dramatically changed. With constant advances in technology, the library and the librarian need to adjust by 'embracing the electronic technology' to meet the constant fluctuation and demands in the user's information seeking behaviour and needs.

Today, scientists and engineers use electronic resources because of quick, easy access, and convenience. Also, very little effort is required to retrieve information from these e-resources.

NEED FOR ELECTRONIC INFORMATION RESOURCES AND SERVICES AMONG THE SCIENTISTS AND ENGINEERS

During the late 1980's and early 1990's many new information technologies arose that revolutionized the way in which people searched for and gathered information. More and more publications began to profile the impact that new electronic resources had on different populations. The coming of the Internet itself was the most fundamental shift since Gutenberg's invention of the printing press, Gleeson [1].

Somewhere between 1994 and 1996 there was a profound shift in electronic resource usage by scientists. The shift could be attributed to the increase in popularity and usability of the Internet itself as well as the resources it contained. Curtis; Weller and Hurd [2] opine that the increase in the use of the electronic information resources was attributed to the availability of more and better electronic resources, desktop access through networked workstations, and user-friendly interface design. With the coming of the twenty-first century, successful storage and retrieval of the exponentially growing body of scientific information quickly became dependent upon the Internet and World Wide Web. The way in which scientists seek information to support teaching, research and creative activities is changing as new technologies and information delivery systems emerge, Brown [3]. Consequently, the traditional model of scientific communication proposed by Garvey and Griffith [4], states that information is primarily disseminated through, and subsequently becomes most highly valued when printed in, refereed journals, is being challenged. Any early model of electronic communication proposed by Lancaster [5], and modernized by Hurd [6], bypasses printed journals, indexes, and abstracting tools and suggests that scientific information dissemination will eventually be purely electronic. In the light of the escalating cost to libraries for purchasing and archiving printed scholarly journals, electronic journals may prove to become the only alternative for maintaining an active platform for scientific scholarly communication, Tenopir and King [7, 8], Odlyzko [9] and Walker [10].

Electronic information services are obviously an upcoming and endearing activity among all the scientists and engineers irrespective of their disciplines and work environment. The on-line access services and the Internet services are the two of the most popular library services in electronic formats today.

USE PATTERNS OF ELECTRONIC INFORMATION RESOURCES

Several studies on the influence of the use of electronic information resources on scholarly work have indicated that the use of electronic literature has improved their work considerably in several ways.

Today Governments, R&D institutions and Universities invest substantial sums of money for providing scholars with the digital literature they need for their research work with the intention that improved access to electronic information resources will lead to increasing scholarly productivity. The transformation of the physical library to the virtual library probably saves time, since one can access publications from one's desktop. The extent of publications available online combined with easier access has tremendously improved scholars' ability to keep abreast in their field, and perhaps inspire new ideas and ultimately enhance the quality of their work.

Several studies on the perceived influence of e-resources use on scholarly productivity have indicated that factors like: (a) Easier to find material, (b) Easier to get hold of material, (c) Extended range of material available electronically, (d) Easier to keep updated in one's field of research, (e) Improved quality of work, (f) Inspired new ideas, (g) Greatly saved working time, (h) Reduced time browsing in libraries, (i) multi-user access, fast access, (j) 24 hour access, (k) Available before print, (l) Multiple file formats for downloading and storing (PDF, RTF, DOC, HTML etc..), (m) enhanced access and visibility to scientific papers, (n) Keeps current about global R&D etc. has indicated that the use of electronic resources has considerably influenced the quality of work of the scholars and inspired new ideas to some extent.

NATIONALAEROSPACE LABORATORIES, BANGALORE AND ALLIEDAEROSPACE ORGANIZATIONS IN BANGALORE: THE SCOPE OF THE PRESENT STUDY

The city of Bangalore, Karnataka is considered the 'Aerospace Hub' of the country with many key aerospace organizations which have already been established several years ago like (a) Hindustan Aeronautics Limited (HAL), (b) National Aerospace Laboratories (NAL), (c) Aeronautical Development Establishment (ADE), (d) Indian Space Research Organization (ISRO), (e) Aeronautical Development Agency (ADA). It also comprises many key Indian Air Force establishments like (a) Air Force Systems and Testing Establishment (ASTE), (b) Air Force Technical College (AFTC) and the (c) Institute of Aviation Medicine (IAM). In a nutshell, many of these organizations come under the broad umbrella of (i) Council of Scientific and Industrial Research (CSIR), (ii) Defense Research and Development Organization (DRDO), (iii) Indian Air Force (IAF), (iv) Educational Institutions like IISc, and (v) Major public sector undertakings. All of them in their own way have significantly contributed to a large number of Indian aerospace programmes.

The National Aerospace Laboratories is India's premier civil aviation R&D aerospace research organization in the country. Its main mandate is the 'Development of aerospace technologies with a strong science content and with a view on their practical application to the design and construction of flight vehicles'. NAL is also required 'to use its aerospace technology base for general industrial applications'. 'Technology' would be its core engine-driver for the future. NAL is also best known for its main sophisticated aerospace R&D testing facilities which are not only unique for this country but also comparable to similar facilities elsewhere in the world.

Today, every NAL scientist has access to online electronic scholarly information right at his desktop. This has been possible with the help of the National Institute of Science Communication and Information Resources (NISCAIR) through its CSIR e-conglomerate. Access has been provided to almost 6,000 e-journals by tying up with 23 international publishers. This facility enables any CSIR scientist to access, browse, search and download 'full-text' journal articles from any computer system connected to the campus wide network. This clearly indicates that 'Electronic Information Resources', more so in the form or e-Journals are extremely important to an aerospace scientist and engineer to keep pace with global R&D.

The present work is a joint initiative with the Department of Studies in Library and Information Science (DOS, LIS), Mysore and the National Aerospace Laboratories, Bangalore.

REVIEW OF LITERATURE

Veeramani et al., [11], opines in his research study that 91 percent of the respondents showed interest in accessing the documents in PDF format.

Jamali et al., [12], in his research paper on log analysis inter-alia quotes Davis whose study of High Wire Journals in 2003 comprising of 16 Universities in US, UK and Sweden found that the log studies indicated a relative preference for PDF versions of articles to HTML among the users. Users tend to read full text after browsing contents. Either abstracts or full text views in HTML preceded requests for full text in PDF format. Three common seeking patterns were found: (1) journal homepage – TOC – HTML full text – PDF full text; (2) PubMed – HTML full text – PDF full text; and (3) journal homepage – search – HTML full text – PDF full text. The findings showed that most requests were for full text in HTML, which were then followed by requesting the full text in PDF, as if the final goal of most visits was to take away a PDF version of an article.

Wusteman [13], indicates in his article that the majority of new networked ejournals and many other electronic serials are delivered via the Web and are currently based on an HTML (HyperText Markup Language), backbone linking articles either in HTML or a different format. This second format may be PDF, PostScript, LaTeX, SGML or even bitmaps.

Coonin [14], expresses in his paper that researchers appreciate electronic research journal services for their search capabilities certainly, but in many cases the primary use of these services is to procure the full text of the article online. The primary output formats seen among the e-journal services examined are HTML and PDF. HTML files are generally fairly small, allowing even complex pages to be delivered to the user's screen quickly. HTML format presents text and graphics decently, especially with the introduction of Cascading Style Sheets (CSS). Portable Document Files (PDFs) were developed primarily to answer the need for better printing results, and PDF has become a common output format for electronic journals.

Hitchcock, et al. [15], elaborates in his paper that many aspects of publishing are being transformed by the arrival of the World Wide Web and its facility to distribute information electronically. For journals, the transformation has barely begun. A large number of journals are now available in electronic form of some kind, but otherwise little has changed. Recently, one leading publisher reportedly described the growth of electronic journals based on the portable document format (PDF) as the "first frontier" facing journal publishers just a couple of years ago.

Nicholas, et al. [16], in their study mention that users chose to view an article in HTML format 38 percent of the time. The shorter view time of PDF suggests that users are printing off with PDF and scan reading with HTML.

Iding et al. [17], describes an instructional intervention in which high school biology students learned to develop criteria for critically evaluating science Websites and scientific information contained in them. Results indicated that the process of learning to critically evaluate Websites was what was most valuable to them. Furthermore, majority of the students reported learning something new and indicated that they would spend more time in evaluating scientific information on Websites.

Jepsen et al. [18], in their study highlight that the Web has a significant impact on the practice in scientific publication. They inter-alia refer Cronin and McKim that the Web is reshaping the ways in which scholars communicate with one another, i.e., new kinds of scholarly and proto-scholarly publishing are emerging, which means that work-in-progress, broadsides, early drafts, and refereed articles are now almost immediately sharable. Another interesting finding in their research is the correlation between PDF files and content classification; that is, PDF files contain a higher proportion of scientific materials than compared with other analyzed Web publication formats. The PDF file format combined with other structural features of content, like in- and outlink information, as well as the English language, may function as evidence of scientific Web material.

Lawrence et al. [19], in their paper bring out the fact that the World Wide Web has revolutionized the way that people access information, and has opened up new possibilities in areas such as digital libraries, general and scientific information dissemination and retrieval, education, commerce, entertainment, government and health care. The author feels that current techniques for access to both general and scientific information on the Web provide much room for improvement, search engines do not provide comprehensive indices of the Web and have difficulty in accurately ranking the relevance of results.

Björk [20], in their paper argue that the Internet has recently made possible the free global availability of scientific journal articles. Open Access (OA) can occur either via OA scientific journals, or via authors posting manuscripts of articles published in subscription journals in open web repositories. So far there have been few systematic studies showing how big the extent of OA is, in particular studies covering all fields of science. Their results revealed that OA already has a significant positive impact on the availability of the scientific journal literature and that there are big differences between scientific disciplines in the uptake.

Lawal [21], in his research paper brings to the reader's attention that e-print archives are mainly for rapid and wide dissemination of information. This is necessary where peer review process and regular publication take too long. Not all the disciplines are up to speed with using e-print archives partly due to the culture of information use in the various disciplines and partly due to low awareness level. Self-archiving initiatives might gain ground as every discipline becomes aware of the potential value for rapid and wider exchange of scientific information, fostering scholarly communication.

King et al [22], in studying a twenty-five year trend of reading by university scientists show substantial increases in average amount of reading with nearly all of this increase coming from library collections. The likely increase in reading from library collections is due in part to a decline in personal subscriptions and increased online bibliographic searching coupled with increased availability of the library collections and, recently, enlarged electronic journal collections.

OBJECTIVES OF THIS STUDY

- To ascertain whether the percentage of preference of scientific designations (grades, cadres) of the aerospace scientists and engineers by the 'Frequency of Usage of Scientific Web Sites' and the 'Most Preferred File Format for e-Journal Downloads' are approximately the same, i.e. whether they are *uniformly distributed* amongst the 16 Indian aerospace organizations selected for the study.
- To study whether the different designations (grades, cadres) of the aerospace scientists *show similar patterns of use* with regard to the 'Frequency of Usage of Scientific Web Sites' and the 'Most Preferred File Format for e-Journal Downloads'.
- To ascertain whether the 'Association of Designations (Grades) of Aerospace Scientists and Engineers' with 'Frequency of Usage of Scientific Web Sites' and the 'Most Preferred File Format for e-Journal Downloads' are homogeneous or heterogeneous in nature amongst the 16 aerospace organizations.

NULL HYPOTHESES

- There is no significant difference in the mean scores of 'Frequency of Usage of Scientific Web Sites' and the 'Most Preferred File Formats for E-Journal Downloads' amongst the aerospace scientists and engineers of the selected 16 aerospace organizations of Bangalore.

MATERIALS AND METHODS

The present study is restricted to the selected 16 prominent aerospace organizations in Bangalore. A total number of 650 survey questionnaires were distributed amongst the aerospace scientists and engineers belonging to these organizations which were found suitable for the study. A total number of 612 questionnaires were received back finally 583 (89.7%) were selected for the study.

A survey questionnaire has been used to conduct this research study. The total population size of this research study is restricted to the 1220 aerospace scientists and engineers in Bangalore. The distribution of Source Data is indicated in *Table 1*. Random sampling technique has been used for selection of the sample size.

Various statistical tests like calculating the arithmetic mean, Chi-Square($\chi 2$), Co-efficient of Variation (CV), generating the P-value tests for obtaining the probability of a test statistic, Analysis of Variance (ANOVA) tests for comparing whether the arithmetic means of several groups are all equal etc., were deployed on the data using the SPSS package. The responses received were tabulated using the SPSS package.

During the distribution of the questionnaire, the different types of designations of the aerospace scientists and engineers were broadly classified into 4 major categories, namely: (a) Scientific and R&D, (b) Armed Forces, (c) Teaching and (d) Managerial on the SPSS spreadsheet. The details of the various grades, cadres coming under these 4 main categories were further classified based on the nature of occupation. *Table 2* gives the details of the broad occupational categories. *Table 3* gives a description of the most frequently used Scientific Web Sites graded on a scale of 0 to 4. *Table 4(a, e)* gives the various file formats again graded on a scale of 0 to 4and Association of Scientific Designations, versus Most Preferred File Formats.

RESULTS AND DISCUSSION

- The χ^2 test indicates that the different grades (designations) of the Aerospace Scientists and Engineers (Chi-Square = 168.068, P Value = 0.000) by the 'Frequency of Use of Scientific Web Sites' *have significant association.*
- The χ^2 test indicates that the different grades (designations) of the Aerospace Scientists and Engineers (Chi- Square = 181.284, P = 0.011) by the 'Most Preferred File Format for Full-Text Downloads - PDF' *have significant association.*
- The χ^2 test indicates that the different grades (designations) of the Aerospace Scientists and Engineers (Chi Square = 174.988, P = 0.024) by the 'Most Preferred File Format for Full-Text Downloads - HTML' *have significant association.*
- The χ^2 test indicates that the different grades (designations) of the Aerospace Scientists and

Engineers (Chi Square = 171.326, P = 0.037) by the 'Most Preferred File Format for Full-Text Downloads– MS-Word' *have significant association.*

- The χ^2 test indicates that the different grades (designations) of the Aerospace Scientists and Engineers (Chi Square = 189.748, P = 0.003) by the 'Most Preferred File Format for Full-Text Downloads - RTF' *have significant association.*
- The χ^2 test indicates that the different grades (designations) of the Aerospace Scientists and Engineers (Chi Square = 181.266, P = 0.011) by the 'Most Preferred File Format for Full-Text Downloads - OCR' *have significant association.*

CONCLUSIONS

The main conclusions that we would like to draw from this study are:

- Aerospace Scientists and Engineers browse a large number of scientific websites for their day to day scientific work and to keep pace with global R&D
- The different grades (designations) of the Aerospace Scientists and Engineers by the 'Frequency of Use of Scientific Web Sites' *have significant association.* This implies that percentages of preference for these different grades (designations) of Aerospace Scientists and Engineers by the 'Frequency of Use of Scientific Web Sites' *are not approximately the same* [Not Uniformly distributed].
- Also it is inferred that the different grades/designations of aerospace scientists and engineers belonging to the 16 aerospace organizations show a 'dissimilar pattern of use' with regard to the 'Frequency of Use Scientific Web Sites'. Therefore the Use Pattern is Heterogeneous.
- Similarly, the different grades (designations) of the Aerospace Scientists and Engineers by the 'Most Preferred File Format for Full-Text e-Journal Downloads for PDF, HTML, MS-Word, RTF and OCR' *have significant association.* This implies that percentages of preference for these different grades (designations) of Aerospace Scientists and Engineers by the 'Most Preferred File format for Full-Text Downloads for PDF, HTML, MS-Word, RTF and OCR' are not approximately the same [Not Uniformly distributed].
- Hence it is inferred that the different grades/designations of aerospace scientists and engineers belonging to the 16 aerospace organizations show a 'dissimilar pattern of use' with regard to the 'Most Preferred File Format for Full-Text e-Journal Downloads for PDF, HTML, MS-Word, RTF and OCR'. Therefore the Use Pattern is Heterogeneous.

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TABLES AND FIGURES

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%)

Geographical Boundary of the Study (16 Prominent Aerospace Organizations of Bangalore, INDIA).

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: Broad Classification of Occupational Categories of Aerospace Scientists and Engineers

SNo.	Broad Occupational Categories	Details of Grades/Designations Coming under the Various Occupational Categories
1.	Scientific and R&D Category	Scientist B, Scientist C, Scientist D, Scientist E, Scientist E1, Scientist E2, Scientist F, Scientist G, Scientist A1, Scientist B1, Scientist C1, Deputy Secretary Grade, Junior Technical Assistant, Scientists-Managerial Cadre (Inter-Organizational Collaborative Projects).
2.	Armed Forces Category	Doctor, Squadron Leader, Wing Commander, Group Captain, Captain, Lieutenant Colonel, Flight Lieutenant, Major
3.	Teaching Category	Professors, Associate Professors, Assistant Professors, Principal Research Scientist, Senior Scientific Officers, Research Scholars
4.	Manager Category	Dy. General Manager-Grade-7, Chief Manager-Grade-6, Senior Manager-Grade-5, Manager-Grade-4, Dy. Manager-Grade-3, Engineer-Grade-2, Assistant Engineer-Grade-1.

Null Hypothesis: There is no association between the various grades (designations) of the Aerospace Scientists and Engineers with the 'Frequency of Use of Scientific Web Sites'.

Chi-Square: The χ^2 test indicates that the different grades (designations) of the Aerospace Scientists and Engineers (Chi-Square = 168.068, P Value = 0.000) by the 'Frequency of Use of Scientific Web Sites' *have significant association.* This implies that percentages of preference for these different grades (designations) of Aerospace Scientists and Engineers by the 'Frequency of Use of Scientific Web Sites' *are not approximately the same* [Not Uniformly distributed].

Table – 3: How frequently do you use the following web sites?

	4 – Most frequently, 3 – Frequently, 2 – Less frequently, 1 – Uncertain, 0 – Do not use					
1	SCIRUS (http://www.scirus.com)	**4**	**3**	**2**	**1**	**0**
2	Google Scholar (http://scholar.google.com)	**4**	**3**	**2**	**1**	**0**
3	OJOSE – Online Journals Search Engine (http://www.ojose.com)	**4**	**3**	**2**	**1**	**0**
4	Biolink – a search engine for scientists (http://www.bio-link.org)	**4**	**3**	**2**	**1**	**0**
5	SciSeek (http://www.sciseek.com)	**4**	**3**	**2**	**1**	**0**
6	CiteSeer (http://citeseer.ist.psu.edu)	**4**	**3**	**2**	**1**	**0**
7	MetaCrawler – multi-threaded scientific search engine (http://www.MetaCrawler.com)	**4**	**3**	**2**	**1**	**0**
8	Scientific Commons (http://scientificcommons.org)	**4**	**3**	**2**	**1**	**0**
9	JSTOR – Journal Storage (www.jstor.org)	**4**	**3**	**2**	**1**	**0**
10	ISI (www.isical.ac.in)	**4**	**3**	**2**	**1**	**0**
11	Invisible.web.com (www.invisible-web.net)	**4**	**3**	**2**	**1**	**0**
12	Alphasearch (www.Alphasearch.org)	**4**	**3**	**2**	**1**	**0**
13	BigHub (www.bighub.com)	**4**	**3**	**2**	**1**	**0**
14	INFOMINE: Multiple Database Search (www.infomine.ucr.edu)	**4**	**3**	**2**	**1**	**0**
15	WebData.com (www.WebData.com)	**4**	**3**	**2**	**1**	**0**
16	SciCentral Gateway (www.scicentral.com)	**4**	**3**	**2**	**1**	**0**
17	The Virtual Technical Reports Center (www.lib.umd.edu/ENGIN/TechReports/Virtual-TechReports.html)	**4**	**3**	**2**	**1**	**0**
18	News Trawler (www.newstrawler.com)	**4**	**3**	**2**	**1**	**0**
19	Athenus (www.athenus.com)	**4**	**3**	**2**	**1**	**0**
20	Google Book (books.google.com)	**4**	**3**	**2**	**1**	**0**
21	DOAJ (Directory of Open Access Journals), www.doaj.org	**4**	**3**	**2**	**1**	**0**
22	Search Engine for Aerospace and Defense Debuts, (www.submitexpress.com)	**4**	**3**	**2**	**1**	**0**

Table – 3(a): Association of Grades (Designations) versus Frequency of Use of Scientific Web Sites

GRADE WISE DISTRIBUTION	Grade (Designation) V/s. Frequency of Use of Scientific Web Sites				
	Do Not Use	Uncertain	Less Frequently	Frequently	Total
Sc A1	0	6	0	0	6
	(0.0)	(100.0)	(0.0)	(0.0)	(100.0)
Sc B1	0	0	0	1	1
	(0.0)	(0.0)	(0.0)	(100.0)	100.0)
Sc B	10	51	30	6	97
	(10.3)	(52.6)	(30.9)	(6.2)	(100.0)
Sc C	2	36	22	4	64
	(3.1)	(56.3)	(34.4)	(6.3)	(100.0)
Sc D	2	8	7	1	18
	(11.1)	(44.4)	(38.9)	(5.6)	(100.0)
Sc E	2	12	6	0	20
	(10.0)	(60.0)	(30.0)	(0.0)	(100.0)
Sc E1	4	22	2	0	28
	(14.3)	(78.6)	(7.1)	(0.0)	(100.0)
Sc E2	2	11	1	0	14
	(14.3)	(78.6)	(7.1)	(0.0)	(100.0)
Sc F	6	32	14	1	53
	(11.3)	(60.4)	(26.4)	(1.9)	(100.0)
Sc G	4	14	4	1	23
	(17.4)	(60.9)	(17.4)	(4.3)	(100.0)
Dy. Secy.	0	1	0	0	1
	(0.0)	(100.0)	(0.0)	(0.0)	(100.0)
Flight Lt.	1	5	2	0	8
	(12.5)	(62.5)	(25.0)	(0.0)	(100.0)
Sqdr. Ldr.	3	13	1	1	18
	(16.7)	(72.2)	(5.6)	(5.6)	(100.0)
Wg. Cdr.	4	21	5	2	32
	(12.5)	(65.6)	(15.6)	(6.3)	(100.0)
Gr.Capt.	4	3	0	0	7
	(57.1)	(42.9)	(0.0)	(0.0)	(100.0)
Capt.	0	2	0	1	3
	(0.0)	(66.7)	(0.0)	(33.3)	(100.0)
Major	1	3	1	0	5
	(20.0)	(60.0)	(20.0)	(0.0)	(100.0)
Lt. Col.	1	0	1	0	2
	(50.0)	(0.0)	(50.0)	(0.0)	(100.0)
Doctor	0	4	2	0	6
	(0.0)	(66.7)	(33.3)	(0.0)	(100.0)
Res. Scholar	0	18	2	0	20
	(0.0)	(90.0)	(10.0)	(0.0)	(100.0)
Sr. Sc. Ofcrs.	0	3	0	0	3
	(0.0)	(100.0)	(0.0)	(0.0)	(100.0)
Princpl. Resch. Scientist	0	0	0	1	1
	(0.0)	(0.0)	(0.0)	(100.0)	(100.0)
Assoc. Prof.	0	5	0	0	5
	(0.0)	(100.0)	(0.0)	(0.0)	(100.0)
Prof.	0	7	0	1	8
	(0.0)	(87.5)	(0.0)	(12.5)	(100.0)
AE Gr.1. (Mgr.Gr.1)	1	1	0	0	2
	(50.0)	(50.0)	(0.0)	(0.0)	(100.0)
Engr.Gr.2(Mgr.Gr.2)	12	46	16	2	76
	(15.8)	(60.5)	(21.1)	(2.6)	(100.0)
Dy.Mgr.Gr.3	3	6	4	0	13
	(23.1)	(46.2)	(30.8)	(0.0)	(100.0)
Mgr.Gr.4	7	12	3	3	25
	(28.0)	(48.0)	(12.0)	(12.0)	(100.0)
SM-Gr.5	1	3	3	1	8
	(12.5)	(37.5)	(37.5)	(12.5)	(100.0)
Ch-Mgr.Gr.6	4	5	1	0	10
	(40.0)	(50.0)	(10.0)	(0.0)	(100.0)
DGM-Gr.7	0	1	2	1	4

	(0.0)	(25.0)	(50.0)	(25.0)	(100.0)
Jr. Tech. Asst.	0	1	0	0	1
	(0.0)	(100.0)	(0.0)	(0.0)	(100.0)
Trainee	1	0	0	0	1
	(100.0)	(0.0)	(0.0)	(0.0)	(100.0)
Total	75	352	129	27	583
Percent	(12.9)	(60.4)	(22.1)	(4.6)	(100.0)
Chi Square and P Value	$\chi^2 = 168.068$, P Value = 0.000				

Key1: Frequency of Use of Scientific Web Sites: (1) 'SCIRUS', (2) 'Google Scholar', (3) OJOSE', (4) 'Biolink', (5) 'SciSeek', (6) 'CiteSeer', (7) 'MetaCrawler', (8) 'Scientific Commons', (9) 'JSTOR', (10) 'ISI', (11) 'Invisible.web.com', (12) 'Alphasearch', (13) 'BigHub', (14) 'INFOMINE', (15) 'WebData.com', (16) 'SciCentral Gateway', (17) 'The Virtual Technical Reports Center', (18) 'News Trawler', (19) 'Athenus', (20) 'Google Book', (21) 'DOAJ' and (22) 'Search engine for Aerospace and Defense Debuts'.

Key2: Figures in Brackets indicate Percentages

Null Hypothesis: There is no association between the various grades (designations) of the Aerospace Scientists and Engineers with the 'Most Preferred File Format for Full-Text Downloads - PDF'.

Chi-Square: The χ^2 test indicates that the different grades (designations) of the Aerospace Scientists and Engineers (Chi-Square = 181.284, P = 0.011) by the 'Most Preferred File Format for Full-Text Downloads - PDF' *have significant association.* This implies that percentages of preference for these different grades (designations) of Aerospace Scientists and Engineers by the 'Most Preferred File format for Full-Text Downloads - PDF' are not approximately the same [Not Uniformly distributed].

Table – 4: Which format do you prefer to download full-text articles?

4 – Most frequently, 3 – Frequently, 2 – Sometimes, 1 – Rare , 0 – Never

1	**PDF**	**4**	**3**	**2**	**1**	**0**
2	**HTML**	**4**	**3**	**2**	**1**	**0**
3	**MS-Word**	**4**	**3**	**2**	**1**	**0**
4	**Rich Text Format (RTF)**	**4**	**3**	**2**	**1**	**0**
5	**OCR**	**4**	**3**	**2**	**1**	**0**

Table – 4(a): Association of Grades (Designations) Versus Most Preferred File Format For Full-Text Downloads - PDF

GRADE WISE DISTRIBUTION	Grade (Designation) V/s. Most Preferred File Format for Full-Text Downloads - PDF					Total
	Never Use	Rare	Sometimes	Frequently	Most Frequently	
Sc A1	1	0	1	0	4	6
	(16.7)	(0.0)	(16.7)	(0.0)	(66.7)	(100.0)
Sc B1	0	0	0	0	1	1
	(0.0)	(0.0)	(0.0)	(0.0)	(100.0)	(100.0)
Sc B	4	5	4	20	64	97
	(4.1)	(5.2)	(4.1)	(20.6)	(66.0)	(100.0)
Sc C	10	1	4	10	39	64
	(15.6)	(1.6)	(6.3)	(15.6)	(60.9)	(100.0)
Sc D	1	0	3	2	12	18
	(5.6)	(0.0)	(16.7)	(11.1)	(66.7)	(100.0)
Sc E	0	2	0	3	15	20
	(0.0)	(10.0)	(0.0)	(15.0)	(75.0)	(100.0)
Sc E1	1	0	3	4	20	28
	(3.6)	(0.0)	(10.7)	(14.3)	(71.4)	(100.0)
Sc E2	2	0	0	1	11	14
	(14.3)	(0.0)	(0.0)	(7.1)	(78.6)	(100.0)
Sc F	10	1	0	9	33	53
	(18.9)	(1.9)	(0.0)	(17.0)	(62.3)	(100.0)
Sc G	3	0	1	5	14	23
	(13.0)	(0.0)	(4.3)	(21.7)	(60.9)	(100.0)
Dy. Secy.	1	0	0	0	0	1
	(100.0)	(0.0)	(0.0)	(0.0)	(0.0)	(100.0)

Analysis of scientific designations (grades) with the 'use patterns of scientific web sites'

Flight Lt.	2	0	0	1	5	8
	(25.0)	(0.0)	(0.0)	(12.5)	(62.5)	(100.0)
Sqdr. Ldr.	1	1	1	6	9	18
	(5.6)	(5.6)	(5.6)	(33.3)	(50.0)	(100.0)
Wg. Cdr.	6	3	2	8	13	32
	(18.8)	(9.4)	(6.3)	(25.0)	(40.6)	(100.0)
Gr.Capt.	1	0	1	2	3	7
	(14.3)	(0.0)	(14.3)	(28.6)	(42.9)	(100.0)
Capt.	0	0	1	0	2	3
	(0.0)	(0.0)	(33.3)	(0.0)	(66.7)	(100.0)
Major	3	0	0	1	1	5
	(60.0)	(0.0)	(0.0)	(20.0)	(20.0)	(100.0)
Lt. Col.	0	0	0	1	1	2
	(0.0)	(0.0)	(0.0)	(50.0)	(50.0)	(100.0)
Doctor	0	0	1	0	5	6
	(0.0)	(0.0)	(16.7)	(0.0)	(83.3)	(100.0)
Res. Scholar	0	0	0	0	20	20
	(0.0)	(0.0)	(0.0)	(0.0)	(100.0)	(100.0)
Sr. Sc. Ofcrs.	1	0	0	0	2	3
	(33.3)	(0.0)	(0.0)	(0.0)	(66.7)	(100.0)
Princpl. Resch. Scientist	0	0	0	0	1	1
	(0.0)	(0.0)	(0.0)	(0.0)	(100.0)	(100.0)
Assoc. Prof.	1	0	0	0	4	5
	(20.0)	(0.0)	(0.0)	(0.0)	(80.0)	(100.0)
Prof.	2	0	1	1	4	8
	(25.0)	(0.0)	(12.5)	(12.5)	(50.0)	(100.0)
AE Gr.1. (Mgr.Gr.1)	0	0	0	0	2	2
	(0.0)	(0.0)	(0.0)	(0.0)	(100.0)	(100.0)
Engr.Gr.2(Mgr.Gr.2)	10	1	6	12	47	76
	(13.2)	(1.3)	(7.9)	(15.8)	(61.8)	(100.0)
Dy.Mgr.Gr.3	3	3	3	2	2	13
	(23.1)	(23.1)	(23.1)	(15.4)	(15.4)	(100.0)
Mgr.Gr.4	7	2	4	4	8	25
	28.0)	8.0)	(16.0)	(16.0)	(32.0)	(100.0)
SM-Gr.5	1	0	0	2	5	8
	(12.5)	(0.0)	(0.0)	(25.0)	(62.5)	(100.0)
Ch-Mgr.Gr.6	4	0	1	2	3	10
	(40.0)	(0.0)	(10.0)	(20.0)	(30.0)	(100.0)
DGM-Gr.7	0	1	1	0	2	4
	(0.0)	(25.0)	(25.0)	(0.0)	(50.0)	(100.0)
Jr. Tech. Asst.	0	0	0	0	1	1
	(0.0)	(0.0)	(0.0)	(0.0)	(100.0)	(100.0)
Trainee	0	0	0	0	1	1
	(0.0)	(0.0)	(0.0)	(0.0)	(100.0)	(100.0)
Total	75	20	38	96	354	583
Percent	(12.9)	(3.4)	(6.5)	(16.5)	(60.7)	(100.0)
Chi-Square and P Value	$\chi^2 = 181.284$, P Value = 0.011					

Key1: Most Preferred File Format for Full-Text Downloads: (1) 'PDF';
Key2: Figures in Brackets indicate Percentages

Null Hypothesis: There is no association between the various grades (designations) of the Aerospace Scientists and Engineers with the 'Most Preferred File Format for Full-Text Downloads - HTML'.

Chi-Square: The χ^2 test indicates that the different grades (designations) of the Aerospace Scientists and Engineers (Chi-Square = 174.988, P = 0.024) by the 'Most Preferred File Format for Full-Text Downloads - HTML' *have significant association.* This implies that percentages of preference for these different grades (designations) of Aerospace Scientists and Engineers by the 'Most Preferred File format for Full-Text Downloads - HTML' are not approximately the same [Not Uniformly distributed].

Table – 4(b): Association of Grades (Designations) Versus Most Preferred File Format For Full-Text Downloads - HTML

GRADE WISE DISTRIBUTION	Grade (Designation) V/s. Most Preferred File Format for Full-Text Downloads - HTML					Total
	Never Use	Rare	Sometimes	Frequently	Most Frequently	
Sc A1	1	0	2	1	2	6
	(16.7)	(0.0)	(33.3)	(16.7)	(33.3)	(100.0)
Sc B1	0	0	0	1	0	1
	(0.0)	(0.0)	(0.0)	(100.0)	(0.0)	(100.0)
Sc B	26	14	18	27	12	97
	(26.8)	(14.4)	(18.6)	(27.8)	(12.4)	(100.0)
Sc C	21	11	13	10	9	64
	(32.8)	(17.2)	(20.3)	(15.6)	(14.1)	(100.0)
Sc D	4	5	4	4	1	18
	(22.2)	(27.8)	(22.2)	(22.2)	(5.6)	(100.0)
Sc E	8	2	7	2	1	20
	(40.0)	(10.0)	(35.0)	(10.0)	(5.0)	(100.0)
Sc E1	17	5	4	2	0	28
	(60.7)	(17.9)	(14.3)	(7.1)	(0.0)	(100.0)
Sc E2	2	6	2	3	1	14
	(14.3)	(42.9)	(14.3)	(21.4)	(7.1)	(100.0)
Sc F	20	1	15	9	8	53
	(37.7)	(1.9)	(28.3)	(17.0)	(15.1)	(100.0)
Sc G	6	5	3	8	1	23
	(26.1)	(21.7)	(13.0)	(34.8)	(4.3)	(100.0)
Dy. Secy.	1	0	0	0	0	1
	(100.0)	(0.0)	(0.0)	(0.0)	(0.0)	(100.0)
Flight Lt.	2	1	1	3	1	8
	(25.0)	(12.5)	(12.5)	(37.5)	(12.5)	(100.0)
Sqdr. Ldr.	8	2	4	4	0	18
	(44.4)	(11.1)	(22.2)	(22.2)	(0.0)	(100.0)
Wg. Cdr.	15	5	8	4	0	32
	(46.9)	(15.6)	(25.0)	(12.5)	(0.0)	(100.0)
Gr.Capt.	4	0	2	0	1	7
	(57.1)	(0.0)	(28.6)	(0.0)	(14.3)	(100.0)
Capt.	0	0	0	2	1	3
	(0.0)	(0.0)	(0.0)	(66.7)	(33.3)	(100.0)
Major	3	0	0	2	0	5
	(60.0)	(0.0)	(0.0)	(40.0)	(0.0)	(100.0)
Lt. Col.	0	0	0	2	0	2
	(0.0)	(0.0)	(0.0)	(100.0)	(0.0)	(100.0)
Doctor	0	1	0	4	1	6
	(0.0)	(16.7)	(0.0)	(66.7)	(16.7)	(100.0)
Res. Scholar	9	4	5	2	0	20
	(45.0)	(20.0)	(25.0)	(10.0)	(0.0)	(100.0)
Sr. Sc. Ofcrs.	1	1	0	0	1	3
	(33.3)	(33.3)	(0.0)	(0.0)	(33.3)	(100.0)
Princpl. Resch. Scientist	0	1	0	0	0	1
	(0.0)	(100.0)	(0.0)	(0.0)	(0.0)	(100.0)
Assoc. Prof.	3	1	1	0	0	5
	(60.0)	(20.0)	(20.0)	(0.0)	(0.0)	(100.0)
Prof.	3	1	3	1	0	8
	(37.5)	(12.5)	(37.5)	(12.5)	(0.0)	(100.0)
AE Gr.1. (Mgr.Gr.1)	0	0	1	1	0	2
	(0.0)	(0.0)	(50.0)	(50.0)	(0.0)	(100.0)
Engr.Gr.2(Mgr.Gr.2)	31	9	24	8	4	76

	(40.8)	(11.8)	(31.6)	(10.5)	(5.3)	(100.0)
Dy.Mgr.Gr.3	3	1	4	1	4	13
	(23.1)	(7.7)	(30.8)	(7.7)	(30.8)	(100.0)
Mgr.Gr.4	9	3	8	4	1	25
	(36.0)	(12.0)	(32.0)	(16.0)	(4.0)	(100.0)
SM-Gr.5	3	0	3	2	0	8
	(37.5)	(0.0)	(37.5)	(25.0)	(0.0)	(100.0)
Ch-Mgr.Gr.6	6	0	2	1	1	10
	(60.0)	(0.0)	(20.0)	(10.0)	(10.0)	(100.0)
DGM-Gr.7	0	0	3	1	0	4
	(0.0)	(0.0)	(75.0)	(25.0)	(0.0)	(100.0)
Jr. Tech. Asst.	0	0	1	0	0	1
	(0.0)	(0.0)	(100.0)	(0.0)	(0.0)	(100.0)
Trainee	1	0	0	0	0	1
	(100.0)	(0.0)	(0.0)	(0.0)	(0.0)	(100.0)
Total	207	79	138	109	50	583
Percent	(35.5)	(13.6)	(23.7)	(18.7)	(8.6)	(100.0)
Chi-Square and P Value	$\chi^2 = 174.988$, P Value = 0.024					

Key1: Most Preferred File Format for Full-Text Downloads: (1) 'HTML';
Key2: Figures in Brackets indicate Percentages

Null Hypothesis: There is no association between the various grades (designations) of the Aerospace Scientists and Engineers with the 'Most Preferred File Format for Full-Text Downloads – MS-Word'.

Chi-Square: The χ^2 test indicates that the different grades (designations) of the Aerospace Scientists and Engineers (Chi-Square = 171.326, P = 0.037) by the 'Most Preferred File Format for Full-Text Downloads – MS-Word' *have significant association.* This implies that percentages of preference for these different grades (designations) of Aerospace Scientists and Engineers by the 'Most Preferred File format for Full-Text Downloads – MS-Word' are not approximately the same [Not Uniformly distributed].

Table – 4(c): Association of Grades (Designations) Versus Most Preferred File Format For Full-Text Downloads – MS-Word

GRADE WISE DISTRIBUTION	Grade (Designation) V/s. Most Preferred File Format for Full-Text Downloads – MS-Word					Total
	Never Use	Rare	Sometimes	Frequently	Most Frequently	
Sc A1	1	1	1	2	1	6
	(16.7)	(16.7)	(16.7)	(33.3)	(16.7)	(100.0)
Sc B1	0	0	0	1	0	1
	(0.0)	(0.0)	(0.0)	(100.0)	(0.0)	(100.0)
Sc B	27	7	26	22	15	97
	(27.8)	(7.2)	(26.8)	(22.7)	(15.5)	(100.0)
Sc C	23	4	21	12	4	64
	(35.9)	(6.3)	(32.8)	(18.8)	(6.3)	(100.0)
Sc D	5	2	7	2	2	18
	(27.8)	(11.1)	(38.9)	(11.1)	(11.1)	(100.0)
Sc E	4	0	5	5	6	20
	(20.0)	(0.0)	(25.0)	(25.0)	(30.0)	(100.0)
Sc E1	10	4	8	4	2	28
	(35.7)	(14.3)	(28.6)	(14.3)	(7.1)	(100.0)
Sc E2	4	2	5	2	1	14
	(28.6)	(14.3)	(35.7)	(14.3)	(7.1)	(100.0)
Sc F	13	7	11	10	12	53
	(24.5)	(13.2)	(20.8)	(18.9)	(22.6)	(100.0)
Sc G	4	2	5	9	3	23
	(17.4)	(8.7)	(21.7)	(39.1)	(13.0)	(100.0)
Dy. Secy.	1	0	0	0	0	1
	(100.0)	(0.0)	(0.0)	(0.0)	(0.0)	(100.0)

Flight Lt.	3	1	1	1	2	8
	(37.5)	(12.5)	(12.5)	(12.5)	(25.0)	(100.0)
Sqdr. Ldr.	8	0	3	5	2	18
	(44.4)	(0.0)	(16.7)	(27.8)	(11.1)	(100.0)
Wg. Cdr.	10	5	8	8	1	32
	(31.3)	(15.6)	(25.0)	(25.0)	(3.1)	(100.0)
Gr.Capt.	4	0	3	0	0	7
	(57.1)	(0.0)	(42.9)	(0.0)	(0.0)	(100.0)
Capt.	0	1	0	0	2	3
	(0.0)	(33.3)	(0.0)	(0.0)	(66.7)	(100.0)
Major	3	0	0	1	1	5
	(60.0)	(0.0)	(0.0)	(20.0)	(20.0)	(100.0)
Lt. Col.	0	0	0	1	1	2
	(0.0)	(0.0)	(0.0)	(50.0)	(50.0)	(100.0)
Doctor	1	2	1	1	1	6
	(16.7)	(33.3)	(16.7)	(16.7)	(16.7)	(100.0)
Res. Scholar	9	3	7	0	1	20
	(45.0)	(15.0)	(35.0)	(0.0)	(5.0)	(100.0)
Sr. Sc. Ofcrs.	0	3	0	0	0	3
	(0.0)	(100.0)	(0.0)	(0.0)	(0.0)	(100.0)
Princpl. Resch. Scientist	0	0	0	1	0	1
	(0.0)	(0.0)	(0.0)	(100.0)	(0.0)	(100.0)
Assoc. Prof.	3	0	0	1	1	5
	(60.0)	(0.0)	(0.0)	(20.0)	(20.0)	(100.0)
Prof.	4	2	2	0	0	8
	(50.0)	(25.0)	(25.0)	(0.0)	(0.0)	(100.0)
AE Gr.1. (Mgr.Gr.1)	0	1	1	0	0	2
	(0.0)	(50.0)	(50.0)	(0.0)	(0.0)	(100.0)
Engr.Gr.2(Mgr.Gr.2)	20	5	25	16	10	76
	(26.3)	(6.6)	(32.9)	(21.1)	(13.2)	(100.0)
Dy.Mgr.Gr.3	6	2	1	3	1	13
	(46.2)	(15.4)	(7.7)	(23.1)	(7.7)	(100.0)
Mgr.Gr.4	8	3	5	7	2	25
	(32.0)	(12.0)	(20.0)	(28.0)	(8.0)	(100.0)
SM-Gr.5	5	0	2	1	0	8
	(62.5)	(0.0)	(25.0)	(12.5)	(0.0)	(100.0)
Ch-Mgr.Gr.6	6	0	1	3	0	10
	(60.0)	(0.0)	(10.0)	(30.0)	(0.0)	(100.0)
DGM-Gr.7	0	1	2	1	0	4
	(0.0)	(25.0)	(50.0)	(25.0)	(0.0)	(100.0)
Jr. Tech. Asst.	0	0	0	1	0	1
	(0.0)	(0.0)	(0.0)	(100.0)	(0.0)	(100.0)
Trainee	0	0	0	0	1	1
	(0.0)	(0.0)	(0.0)	(0.0)	(100.0)	(100.0)
Total	182	58	151	120	72	583
Percent	(31.2)	(9.9)	(25.9)	(20.6)	(12.3)	(100.0)
Chi-Square and P Value	$\chi^2 = 171.326$, P Value = 0.037					

Key1: Most Preferred File Format for Full-Text Downloads: (1) 'MS-Word';
Key2: Figures in Brackets indicate Percentages

Null Hypothesis: There is no association between the various grades (designations) of the Aerospace Scientists and Engineers with the 'Most Preferred File Format for Full-Text Downloads - RTF'.

Chi-Square: The χ^2 test indicates that the different grades (designations) of the Aerospace Scientists and Engineers (Chi-Square = 189.748, P = 0.003) by the 'Most Preferred File Format for Full-Text Downloads - RTF' *have significant association.* This implies that percentages of preference for these different grades (designations) of Aerospace Scientists and Engineers by the 'Most Preferred File format for Full-Text Downloads - RTF' are not approximately the same [Not Uniformly distributed].

Table – 4(d): Association of Grades (Designations) Versus Most Preferred File Format For Full-Text Downloads - RTF

GRADE WISE DISTRIBUTION	Grade (Designation) V/s. Most Preferred File Format for Full-Text Downloads - RTF					Total
	Never Use	Rare	Sometimes	Frequently	Most Frequently	
Sc A1	4 (66.7)	0 (0.0)	0 (0.0)	2 (33.3)	0 (0.0)	6 (100.0)
Sc B1	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)
Sc B	38 (39.2)	16 (16.5)	21 (21.6)	16 (16.5)	6 (6.2)	97 (100.0)
Sc C	31 (48.4)	14 (21.9)	9 (14.1)	9 (14.1)	1 (1.6)	64 (100.0)
Sc D	5 (27.8)	5 (27.8)	6 (33.3)	1 (5.6)	1 (5.6)	18 (100.0)
Sc E	10 (50.0)	2 (10.0)	2 (10.0)	3 (15.0)	3 (15.0)	20 (100.0)
Sc E1	21 (75.0)	4 (14.3)	3 (10.7)	0 (0.0)	0 (0.0)	28 (100.0)
Sc E2	8 (57.1)	2 (14.3)	2 (14.3)	2 (14.3)	0 (0.0)	14 (100.0)
Sc F	25 (47.2)	6 (11.3)	12 (22.6)	6 (11.3)	4 (7.5)	53 (100.0)
Sc G	10 (43.5)	4 (17.4)	3 (13.0)	5 (21.7)	1 (4.3)	23 (100.0)
Dy. Secy.	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)
Flight Lt.	6 (75.0)	0 (0.0)	1 (12.5)	1 (12.5)	0 (0.0)	8 (100.0)
Sqdr. Ldr.	13 (72.2)	0 (0.0)	3 (16.7)	2 (11.1)	0 (0.0)	18 (100.0)
Wg. Cdr.	15 (46.9)	2 (6.3)	11 (34.4)	3 (9.4)	1 (3.1)	32 (100.0)
Gr.Capt.	5 (71.4)	0 (0.0)	2 (28.6)	0 (0.0)	0 (0.0)	7 (100.0)
Capt.	0 (0.0)	0 (0.0)	1 (33.3)	0 (0.0)	2 (66.7)	3 (100.0)
Major	5 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	5 (100.0)
Lt. Col.	1 (50.0)	0 (0.0)	0 (0.0)	1 (50.0)	0 (0.0)	2 (100.0)
Doctor	2 (33.3)	2 (33.3)	2 (33.3)	0 (0.0)	0 (0.0)	6 (100.0)
Res. Scholar	12 (60.0)	4 (20.0)	3 (15.0)	1 (5.0)	0 (0.0)	20 (100.0)
Sr. Sc. Ofcrs.	2 (66.7)	0 (0.0)	0 (0.0)	1 (33.3)	0 (0.0)	3 (100.0)
Princpl. Resch. Scientist	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)	1 (100.0)
Assoc. Prof.	4 (80.0)	0 (0.0)	1 (20.0)	0 (0.0)	0 (0.0)	5 (100.0)
Prof.	6 (75.0)	2 (25.0)	0 (0.0)	0 (0.0)	0 (0.0)	8 (100.0)
AE Gr.1. (Mgr.Gr.1)	1 (50.0)	1 (50.0)	0 (0.0)	0 (0.0)	0 (0.0)	2 (100.0)
Engr.Gr.2(Mgr.Gr.2)	41 (53.9)	10 (13.2)	15 (19.7)	8 (10.5)	2 (2.6)	76 (100.0)

Dy.Mgr.Gr.3	7	1	2	3	0	13
	(53.8)	(7.7)	(15.4)	(23.1)	(0.0)	(100.0)
Mgr.Gr.4	11	6	3	5	0	25
	(44.0)	(24.0)	(12.0)	(20.0)	(0.0)	(100.0)
SM-Gr.5	4	3	0	1	0	8
	(50.0)	(37.5)	(0.0)	(12.5)	(0.0)	(100.0)
Ch-Mgr.Gr.6	7	0	1	2	0	10
	(70.0)	(0.0)	(10.0)	(20.0)	(0.0)	(100.0)
DGM-Gr.7	1	1	2	0	0	4
	(25.0)	(25.0)	(50.0)	(0.0)	(0.0)	(100.0)
Jr. Tech. Asst.	0	0	1	0	0	1
	(0.0)	(0.0)	(100.0)	(0.0)	(0.0)	(100.0)
Trainee	0	0	0	0	1	1
	(0.0)	(0.0)	(0.0)	(0.0)	100.0)	100.0)
Total	297	85	106	73	22	583
Percent	(50.9)	(14.6)	(18.2)	(12.5)	(3.8)	(100.0)
Chi-Square and P Value	$\chi^2 = 189.748$, P Value = 0.003					

Key1: Most Preferred File Format for Full-Text Downloads: (1) 'RTF';

Key2: Figures in Brackets indicate Percentages

Null Hypothesis: There is no association between the various grades (designations) of the Aerospace Scientists and Engineers with the 'Most Preferred File Format for Full-Text Downloads - OCR'.

Chi-Square: The χ^2 test indicates that the different grades (designations) of the Aerospace Scientists and Engineers (Chi-Square = 181.266, P = 0.011) by the 'Most Preferred File Format for Full-Text Downloads - OCR' *have significant association.* This implies that percentages of preference for these different grades (designations) of Aerospace Scientists and Engineers by the 'Most Preferred File format for Full-Text Downloads - OCR' are not approximately the same [Not Uniformly distributed].

Table – 4(e): Association of Grades (Designations) Versus Most Preferred File Format For Full-Text Downloads - OCR

GRADE WISE DISTRIBUTION	Grade (Designation) V/s. Most Preferred File Format for Full-Text Downloads - OCR					Total
	Never Use	Rare	Sometimes	Frequently	Most Frequently	
Sc A1	6	2	0	0	0	8
	(75.0)	(25.0)	(0.0)	(0.0)	(0.0)	(100.0)
Sc B1	1	0	0	0	0	1
	(100.0)	(0.0)	(0.0)	(0.0)	(0.0)	(100.0)
Sc B	56	12	14	11	4	97
	(57.7)	(12.4)	(14.4)	(11.3)	(4.1)	(100.0)
Sc C	42	9	6	4	3	64
	(65.6)	(14.1)	(9.4)	(6.3)	(4.7)	(100.0)
Sc D	10	5	3	0	0	18
	(55.6)	(27.8)	(16.7)	(0.0)	(0.0)	(100.0)
Sc E	14	3	0	2	1	20
	(70.0)	(15.0)	(0.0)	(10.0)	(5.0)	(100.0)
Sc E1	23	4	1	0	0	28
	(82.1)	(14.3)	(3.6)	(0.0)	(0.0)	(100.0)
Sc E2	12	1	0	1	0	14
	(85.7)	(7.1)	(0.0)	(7.1)	(0.0)	(100.0)
Sc F	33	8	8	1	3	53
	(62.3)	(15.1)	(15.1)	(1.9)	(5.7)	(100.0)
Sc G	14	1	3	5	0	23
	(60.9)	(4.3)	(13.0)	(21.7)	(0.0)	(100.0)
Dy. Secy.	1	0	0	0	0	1
	(100.0)	(0.0)	(0.0)	(0.0)	(0.0)	(100.0)
Flight Lt.	6	0	0	1	1	8

	(75.0)	(0.0)	(0.0)	(12.5)	(12.5)	(100.0)
Sqdr. Ldr.	12	1	1	4	0	18
	(66.6)	(5.5)	(5.5)	(22.2)	(0.0)	(100.0)
Wg. Cdr.	16	5	7	3	1	32
	(50)	(15.6)	(21.8)	(9.4)	(3.1)	(100.0)
Gr.Capt.	5	0	2	0	0	7
	(71.4)	(0.0)	(28.6)	(0.0)	(0.0)	(100.0)
Capt.	1	0	0	0	2	3
	(33.3)	(0.0)	(0.0)	(0.0)	(66.7)	(100.0)
Major	5	0	0	0	0	5
	(100.0)	(0.0)	(0.0)	(0.0)	(0.0)	(100.0)
Lt. Col.	1	0	1	0	0	2
	(50.0)	(0.0)	(50.0)	(0.0)	(0.0)	(100.0)
Doctor	4	0	2	0	0	6
	(66.7)	(0.0)	(33.3)	(0.0)	(0.0)	(100.0)
Res. Scholar	17	1	2	0	0	20
	(85.0)	(5.0)	(10.0)	(0.0)	(0.0)	(100.0)
Sr. Sc. Ofcrs.	1	2	0	0	0	3
	(33.3)	(66.7)	(0.0)	(0.0)	(0.0)	(100.0)
Princpl. Resch. Scientist	0	0	1	0	0	1
	(0.0)	(0.0)	(100.0)	(0.0)	(0.0)	(100.0)
Assoc. Prof.	5	0	0	0	0	5
	(100.0)	(0.0)	(0.0)	(0.0)	(0.0)	(100.0)
Prof.	5	3	0	0	0	8
	(62.5)	(37.5)	(0.0)	(0.0)	(0.0)	(100.0)
AE Gr.1. (Mgr.Gr.1)	2	0	0	0	0	2
	(100.0)	(0.0)	(0.0)	(0.0)	(0.0)	(100.0)
Engr.Gr.2(Mgr.Gr.2)	52	11	10	2	1	76
	(68.4)	(14.5)	(13.2)	(2.6)	(1.3)	(100.0)
Dy.Mgr.Gr.3	8	2	1	2	0	13
	(61.5)	(15.4)	(7.7)	(15.4)	(0.0)	(100.0)
Mgr.Gr.4	17	4	2	2	0	25
	(68.0)	(16.0)	(8.0)	(8.0)	(0.0)	(100.0)
SM-Gr.5	6	2	0	0	0	8
	(75.0)	(25.0)	(0.0)	(0.0)	(0.0)	(100.0)
Ch-Mgr.Gr.6	8	1	1	0	0	10
	(80.0)	(10.0)	(10.0)	(0.0)	(0.0)	(100.0)
DGM-Gr.7	1	2	1	0	0	4
	(25.0)	(50.0)	(25.0)	(0.0)	(0.0)	(100.0)
Jr. Tech. Asst.	1	0	0	0	0	1
	(100.0)	(0.0)	(0.0)	(0.0)	(0.0)	(100.0)
Trainee	1	0	0	0	0	1
	(100.0)	(0.0)	(0.0)	(0.0)	(0.0)	(100.0)
Total	384	79	66	38	16	583
Percent	(65.9)	(13.6)	(11.3)	(6.5)	(2.7)	(100.0)
Chi-Square and P Value	$\chi^2 = 181.266$, P Value = 0.011					

Key1: Most Preferred File Format for Full-Text Downloads: (1) 'OCR';
Key2: Figures in Brackets indicate Percentages