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Knowledge on ICT Skills among LIS Professionals of Engineering Institutions of Andhra Pradesh State: A Survey

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ABSTRACT

Over the decades, there has been a remarkable transformation in the information globe. Everyone has to adapt to these changes. Changes in society and demands for information utilisation have forced the information professionals to look for more effective and efficient methods for processing, storing, and retrieving information to cope up with the application of modern information technology. This paper highlights knowledge of information communication technology (ICT) in engineering institutional library and information science (LIS) professionals working engineering institutions of Rayalaseema region of Andhra Pradesh.

Keywords: LIS professionals, information communication technology (ICT), skills

1. INTRODUCTION

The recent development in science and technology[1] has led to a new startling condition concerning information created in the world. In the present ICT era, it becomes necessary for the librarians to use the computers and other devices in the day-to-day work. In this context, the librarians shall possess, in addition to the academic and professional qualifications, certain ICT skills, such as dexterity in operating systems, use of application software packages, knowledge of databases and programming, acquaintance in webpage design, library automation software, technical skills, and managerial skills. This survey has been aimed to estimate the level of knowledge on ICT skills by the respondent librarians. This paper analyses various ICT skills possessed by LIS professionals like programming languages, application software packages, Database management system (DBMS), library management software an d web design and also finds out the constraints encountered by LIS professionals in acquiring ICT skills.

2. LITERATURE REVIEW

According to Arokyamary[2], information communication technology (ICT) facilitates access to electronic information that has become invaluable and complementing traditional library services. The authors discuss on mapping the existing ICT skills and competencies of the LIS professionals working in the Engineering colleges of Karnataka and thus comes out with suggestions in bridging the gap by stating the required knowledge, skills and competencies that has not only brought a change in the working style of LIS professionals but also essential for them to survive and flourish in this digital era. Satpathy[3] presents a case study of the ICT skills of professionals trained in library and information sciences (LIS) at engineering colleges in Orissa, India. The study aims to identify the ICT skills possessed by LIS professionals as well as the application of these skills and the challenges faced by LIS professionals. The study found that many of the librarians interviewed possessed a Master's degree in LIS and were computer literate, and recommended that engineering institutes update the infrastructural facilities of their libraries in order to use the ICT skills of LIS-trained employees. Atulomah[4] discusses about the attitudes and knowledge of academic librarians in Southwest Nigeria concerning Library 2.0. The benefits of and barriers to installing ICT in Nigerian university libraries are discussed. Demographic and attitudinal variables of the respondents are noted. Discussions include the Nigerian Library Association's continuing efforts to gain global recognition, mentoring and training of young librarians by senior librarians, and solving the country's energy problem.

3. OBJECTIVES

The objectives of this study are to:

- Analyse the knowledge of ICT of LIS professionals in Engineering instituions in Rayalaseema Region of Andhra Pradesh.
- Classify the librarians by age, sex, qualification and experience depending on the types of institutions they serve.

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- Find out LIS professional skills in operating systems, use of application software packages, programming languages, technical skills, managerial skills and other ICT related activities.
- Know the constraints encountered by LIS professionals in acquiring ICT skills.
- Do a factor analysis on the overall skills possessed by LIS professionals in Rayalaseema region of Andhra Pradesh.

The study covers the attempts of the engineering educational institutions established up to July 2010 only. The survey covers only the librarians of the respective institutions and the semi professionals not covered (Assistant Librarian, Library Assistants and others).

4. METHODOLOGY

The respondents from the questionnaire were drawn from three types of Engineering[5] Institutions (Government, Minority and Private) in the Rayalaseema Region of Andhra Pradesh. Population sampling technique was adopted for data collection. This survey has considered 92 institutions, which were established before 2010, and a structured questionnaire was framed. Out of 92 questionnaires distributed only 81 have responded, Table 1 presents the data pertaining to the distribution of questionnaires and the responses received.

A majority (72) of the respondents belong to Private Engineering Institutions. About 3 response belongs to Private Minority Engineering Institutions and only 6 belong to Government Institution.

5. WEIGHTED ARITHMETIC MEAN

This paper uses WAM-Weighted Arithmetic Mean6 methodology for analysing the data that was introduced by Cotes, Roger. The weighted arithmetic mean used in statistical analysis of grouped data: each number xi is the midpoint of an interval, and each corresponding value of wi is the number of data points within that interval. For a given set of data, many possible means can be defined, depending on which features of the data are of interest. Weighted arithmetic mean is computed by using the following formula:

$$\bar{X}_w = \frac{\sum wz}{\sum w}$$

$\bar{X}_w$ -Weighted arithmetic mean

x - Values of the items, and

w - Weight of the item

5.1 Three-factor analysis

This survey also applies additional statistical tool, namely, Three-Factor analysis Varimax Rotation (Component Score Coefficient Matrix). Factor analysis attempts to bring inter co-related variables together under more general underlying variables. More specifically, the goal of factor analysis[7] is to explain the variance in the observed variables in terms of principal latent factors.

6. DATA ANALYSIS AND INTERPRETATION

6.1 Profile of Library and Information Science Professionals

Figure 1 represents the gender of the librarians with respect to the types of the institutions they serve. It is found that majorities (81.48 %) of librarians belong to male community and only 8.52 % belong to the female population. In other words, there are no female librarians in government institutions. Generally, the LIS professionals are dominated by the feminine gender in the Western and European countries. However, it is observed in the study that the numbers of female librarians are incredibly low, contrary to the expected situation.

6.2 Types of Institutions Vs Age of Librarians

Table 1 presents the classification of the librarians by age and type of the institutions. It is found that about more than three-fourth of the sample (62 out of 81) belong to less than 40 years. This shows that they are all young librarians possessing skills and zeal to work with creativity.

6.3 Types of Institutions Vs Qualification of Librarians

Table 2 reveals the qualification (academic and professional) of the librarians under survey. It is interesting to note that all librarians are qualified with a Master's degree in LIS (MLIS) and nearly two-thirds (49.38 %) possess MPhil degree and 8 with PhD degree in LIS.

Table 1. Types of institutions vs age of librarians

S. No.	Age of librarians	Types of institutions			Total (%)
		Govt. (%)	Minority (%)	Private (%)	
1.	Below 30	0	0	20 (24.69 %)	20 (24.69 %)
2.	Between 31 and 35	1 (1.23 %)	0	24 (29.63 %)	25 (30.87 %)
3.	Between 36 and 40	0	1(1.23 %)	16 (19.75 %)	17(20.98 %)
4.	Between 41 and 45	2 (2.47 %)	1(1.23 %)	10 (12.35 %)	13 (16.05 %)
5.	Above 45	3 (3.71 %)	1(1.24 %)	2 (2.47 %)	6 (7.41 %)
Total		**6 (7.41 %)**	**3 (3.70 %)**	**72 (88.89 %)**	**81 (100%)**

Table 2. Types of institutions vs qualifications of librarians

S. No.	Qualifications of librarians	Types of institutions			Total
		Govt. (%)	Minority (%)	Private (%)	
1.1	Under Graduate	0	0	21 (25.93 %)	21 (25.93 %)
1.2	Post Graduate	2 (2.47 %)	2 (2.47 %)	36 (44.44)	40 (49.38 %)
1.3	MPhil	1 (1.23 %)	1 (1.23 %)	10 (12.35 %)	12 (14.81 %)
1.4	PhD	3 (3.70 %)	0	5 (6.17 %)	8 (9.88 %)

6.4 Types of Institutions Vs Experience of Librarians

Table 3 presents the information pertaining to the experience of the librarians and types of institution. Nearly half of the sample librarians 39 have experience ranging below 5 years. More than one third of the samples 22 falls below 11 and above 5 years of experience. It is observed that the greater the number of librarians, smaller the duration of the service.

Table 3. Types of institutions vs experience of librarians

S. No.	Experience in years	Types of institutions			Total
		Govt. (%)	Minority (%)	Private (%)	
1.	Below 5 Years	2 (2.47 %)	0	37 (45.68 %)	39 (48.15 %)
2.	Between 6 and 10 Years	0	1 (1.23 %)	19 (23.46 %)	20 (24.69 %)
3.	Above 11	4 (4.94 %)	2 (2.47 %)	16 (19.75 %)	22 (27.16 %)
Total		**6 (7.41 %)**	**3 (3.70 %)**	**72 (88.89)**	**81 (100 %)**

6.5 Knowledge of Operating Systems

Table 4 provide the respondents' level of knowledge in using operating systems such as 'Windows', 'Unix', 'Linux', 'Mac OS', 'Sun Solaris'. For the purpose of analysis, five-point scale technique has been used and based on that WAM has been calculated and the results are provided in Table 4.

Table 4 shows that the highest WAM value has been arrived at for the respondent's knowledge in 'Windows' (20.40 %) followed by 'Unix' (8.40 %). The respondents' familiarity in "Linux, MacOS and Sun Solaris" are less and many libraries use 'Windows' and 'Unix' and hence, they were given higher ranks.

6.6 Knowledge of Programming Languages

Table 5 disclose respondents' intensity of knowledge of various programming languages, the highest WAM value (8.33) has been arrived at for the respondents' level of knowledge in.Net.

6.7 Knowledge of Application Software Packages

In this survey, it has been aimed at to estimate the level of respondents' acquaintance in the application software packages such as 'MS-Word', 'MS-Excel', 'MS-Access', MS-PowerPoint, and MS-Publishers'.

Table 4. Knowledge of operating systems

S. No.	Operating systems	Not known (%)	Poor (%)	Satisfactory (%)	Good (%)	Excellent (%)	WAM	Rank
1.	Windows	1 (1.23 %)	1 (1.23 %)	24 (29.63 %)	44 (54.32 %)	11 (13.58 %)	20.40	1
2.	Unix	61 (75.31 %)	5 (6.17 %)	7 (8.64 %)	6 (7.41 %)	2 (2.47 %)	8.40	2
3.	Linux	62 (76.54 %)	5 (6.17 %)	9 (11.11 %)	3 (3.70 %)	2 (2.47 %)	8.07	3
4.	Mac OS	71 (87.65 %)	4 (4.94 %)	2 (2.47 %)	2 (2.47 %)	2 (2.47 %)	6.87	4
5.	Sun Solaris	75 (92.59 %)	2 (2.47 %)	1 (1.23 %)	1 (1.23 %)	2 (2.47 %)	6.40	5

Table 5. Knowledge of programming languages

S. No.	Programming languages	Not Known (%)	Poor (%)	Satisfactory (%)	Good (%)	Excellent (%)	WAM	Rank
1.	C, C++ & C#	69 (85.19 %)	1 (1.23 %)	3 (3.70 %)	6 (7.41 %)	2 (2.47 %)	7.60	3
2.	Java	68 (83.95 %)	6 (7.41 %)	2 (2.47 %)	1 (1.23 %)	4 (4.94 %)	7.33	4
3.	PERL	73 (90.12 %)	3 (3.70 %)	2 (2.47 %)	1 (1.23 %)	2 (2.47 %)	6.60	5
4.	Pascal/Cobol	72 (88.89 %)	4 (4.94 %)	2 (2.47 %)	1 (1.23 %)	2 (2.47 %)	6.67	4
5.	.Net	64 (79.01 %)	1 (1.23 %)	6 (7.41 %)	9 (11.11 %)	1 (1.23 %)	8.33	1
6.	Visual Basic	64 (79.01 %)	2 (2.47 %)	6 (7.41 %)	7 (8.64 %)	2 (2.47 %)	8.27	2

It is observed from Table 6 that the highest WAM value has been arrived at the respondents' level of knowledge in application of MS-Word (20.53 %), followed by MS-Excel (19.53 %) and MS-PowerPoint (18.40 %).

6.8 Knowledge of DBMS/RDBMS

Table 7 explain the respondents' understanding in database management systems. The highest WAM value has been arrived at for the respondents' knowledge in Oracle (10.07) followed by SQL/My SQL (9.07).

6.10 Knowledge of Library Management Software

Library management software provides a comprehensive library management solution that enables information provider, information manager, resource in-charge, resource manager and librarians to manage and disseminate information available in various kinds of resources including print material (Book, Journal, Thesis) and non-print material (CD, DVD, E-Journal, Video, Audio files, Scanned images, etc.). Table 9 presents librarians' level of knowledge of library management software.

Table 6. Knowledge of application software packages

S. No.	Packages	Not known (%)	Poor (%)	Satisfactory (%)	Good (%)	Excellent (%)	WAM	Rank
1.	MS-Word	2 (2.47 %)	1 (1.23 %)	23 (28.04 %)	40 (49.38 %)	15 (18.52 %)	20.53	1
2.	MS-Excel	2 (2.47 %)	2 (2.47 %)	32 (39.51 %)	34 (41.98 %)	11 (13.58 %)	19.53	2
3.	MS-Access	23 (28.40 %)	16 (19.75 %)	13 (16.05 %)	25 (30.86 %)	4 (4.94 %)	14.27	4
4.	MS-Power Point	9 (11.11 %)	1 (1.23 %)	25 (30.86 %)	40 (49.38 %)	6 (7.41 %)	18.40	3
5.	Ms-Publishers	48 (59.2 %6)	4 (4.94 %)	6 (7.41 %)	22 (27.61 %)	1 (1.23 %)	11.13	5

Table 7. Knowledge of DBMS/RDBMS

S. No.	DBMS/RDBMS	Not Known (%)	Poor (%)	Satisfactory (%)	Good (%)	Excellent (%)	WAM	Rank
1.	Oracle	55 (67.90 %)	2 (2.47 %)	5 (6.17 %)	18 (22.22 %)	1 (1.23 %)	10.07	1
2.	SQL/MySQL	60 (74.07 %)	3 (3.70 %)	3 (3.70 %)	14 (17.28 %)	1 (1.23 %)	9.07	2

6.9 Knowledge in Other Utilities

Table 8 depicts the respondents' level of knowledge in other utilities of ICTs. The highest WAM value (11.13 %) has been arrived at for the respondents' level of knowledge in WinZip followed by WinRAR (10.80 %) and Nero Start Smart (10.20 %).

6.11 Knowledge of Web-designing Tools

One of the technical skills, which librarian should possess is the awareness of web design. It is found from Table 10 that most of the respondents' relatively possess a higher level of acquaintance in 'HTML/ XML PDF', since the WAM has arrived at 11.40.

Table 8. Knowledge in Other Utilities

S. No.	Other utilities	Not known (%)	Poor (%)	Satisfactory (%)	Good (%)	Excellent (%)	WAM	Rank
1.	Nero Start Smart	**54 (66.67)**	1 (1.23 %)	9 (11.11 %)	15 (18.52 %)	2 (2.47 %)	10.20	3
2.	WinZip	49 (60.49 %)	1 (1.23 %)	12 (14.81 %)	15 (18.52 %)	4 (4.94 %)	11.13	1
3.	WinRAR	50 (61.73 %)	2 (2.47 %)	11 (13.58 %)	15 (18.52 %)	3 (3.70 %)	10.80	2

Table 9. Knowledge of library management software

S. No.	Library management s/w	No. of respondents (%)
1.	Excellent	7 (8.64 %)
2.	Good	27 (33.34 %)
3.	Satisfactory	40 (49.38 %)
4.	Poor	2 (2.47 %)
5.	Not Known	5 (6.17 %)
Total		**81 (100 %)**

6.12 Knowledge on Other Online Utilities and Services

The present epoch librarians are needed to possess sufficient knowledge and skills in the use and exploitation of diverse online utilities and services. Therefore, the respondents were asked to rank their level of knowledge in various online

Table 10. Knowledgeof web-designing tools

S. No.	Web awareness	Not known (%)	Poor (%)	Satisfactory (%)	Good (%)	Excellent (%)	WAM	Rank
1.	HTML / XML / PDF	48 (59.26 %)	1 (1.23 %)	10 (12.35)	19 (23.46 %)	3 (3.70 %)	11.40	1
2.	Java Script	60 (74.07 %)	1 (1.23 %)	6 (7.41)	13 (16.05 %)	1 (1.23 %)	9.13	2
3.	Visual Basic Script	67 (82.72 %)	1 (1.23 %)	3 (3.70 %)	9 (11.11 %)	1 (1.23 %)	7.93	3
4.	Flash	68 (83.95 %)	1 (1.23 %)	3 (3.70 %)	8 (9.88 %)	1 (1.23 %)	7.73	4

Table 11. Knowledge of other online utilities and services

S. No.	Other online utilities	Not known (%)	Poor (%)	Satisfactory (%)	Good (%)	Excellent (%)	WAM	Rank
1.	Search Engine	1 (1.23 %)	2 (2.47 %)	27 (33.33 %)	41 (50.62 %)	10 (12.35 %)	20.00	2
2.	E-mail	1 (1.23 %)	1 (1.23 %)	28 (34.57 %)	40 (49.38 %)	11 (13.58 %)	20.13	1
3.	Online LIS Group	25 (30.86 %)	2 (2.47 %)	17 (20.99 %)	33 (40.74 %)	4 (4.94 %)	15.47	3
4.	Online LIS Networks	32 (39.51 %)	3 (3.70 %)	11 (13.58 %)	32 (39.51 %)	3 (3.70 %)	14.27	5
5.	Online LIS Forums	33 (40.74 %)	6 (7.41)	10 (12.35 %)	29 (35.80 %)	3 (3.70 %)	13.73	7
6.	Online LIS Blogs	34 (41.98 %)	4 (4.94 %)	8 (9.88 %)	32 (39.51 %)	3 (3.70 %)	13.93	6
7.	Subject gateways	31 (38.27 %)	3 (3.70 %)	11 (13.58 %)	33 (40.74 %)	3 (3.70 %)	14.47	4
8.	Electronic Document Delivery Service	47 (58.02 %)	3 (3.70 %)	13 (16.05 %)	16 (19.75 %)	2 (2.47 %)	11.07	9
9.	OPAC / Web OPAC	46 (56.79 %)	1 (1.23 %)	11 (13.58 %)	20 (24.69 %)	3 (3.70 %)	11.73	8

utilities and services in a library. Accordingly, the results presented in Table 11 with WAM values and rank order.

Out of nine online utilities and services, the first five ranks based on WAM are: (a) E-mail (20.13 %), (b) Search engine (20 %), (c) Online LIS group (15.47 %), (d) Subject gateway (14.47 %), and (e) Online LIS Networks (13.73).

6.13 Knowledge of Technical Skills

Two types of technical skills have been identified and respondents were asked to rank their level of knowledge on those technical skills. The data have been analysed and consequential WAM values are shown in Table 12.

Table 12. Knowledge of technical skills

S. No.	Technical Skills	Not known (%)	Poor (%)	Satisfactory (%)	Good (%)	Excellent (%)	WAM	Rank
1.	Imaging Technology	56 (69.14 %)	6 (7.41 %)	7 (8.64 %)	11 (13.58 %)	1 (1.23 %)	**9.20**	**2**
2.	Optical Character Recognition (OCR)	55 (67.90 %)	5 (6.17 %)	8 (9.88 %)	12 (14.81 %)	1 (1.23 %)	**9.47**	**1**

Table 13. Knowledge of managerial skills

S. No.	Managerial Skills	Not known (%)	Poor (%)	Satisfactory (%)	Good (%)	Excellent (%)	WAM	Rank
1.	Project Management	19 (23.46 %)	1 (1.23 %)	23 (28.40 %)	35 (43.21 %)	3 (3.70 %)	**16.33**	**3**
2.	Resource Management	20 (24.69 %)	3 (3.70 %)	17 (20.99 %)	33 (40.74 %)	8 (9.88 %)	**16.60**	**1**
3.	Systems Management	21 (25.93 %)	1 (1.23 %)	20 (24.69 %)	35 (43.21 %)	4 (4.94 %)	**16.20**	**4**
4.	Fund Raising	23 (28.40 %)	2 (2.47 %)	18 (22.22 %)	34 (41.98 %)	4 (4.94 %)	**15.80**	**5**
5.	Effective Leadership	19 (23.46 %)	1 (1.23 %)	22 (27.16 %)	35 (43.21 %)	4 (4.94 %)	**16.47**	**2**

6.14 Knowledge of Managerial Skills

The respondent librarians' levels of knowledge of managerial skills are presented in Table 13.

6.15 Knowledge of Subject (LIS) Skills

It is seen from the Table 14 that five types of skills have been analysed and the respondents' level of knowledge in managerial skills through WAM, value are in the order of preference are as follows:

1. Resource Management (16.60 %)
2. Effective Leadership (16.47 %)
3. Project Management (16.33 %)

It is noted from the above table that the majority of librarians (54.33 %) possesses good knowledge on subject skills.

Table 14 presents librarians' response towards knowledge in Library Science (Subject) skills.

Table 14. Knowledge of subject (LIS) skills

S. No.	Subject (LIS) skills	No. of respondents (%)
1.	Excellent	4 (4.94 %)
2.	Good	44 (54.33 %)
3.	Satisfactory	16 (19.75 %)
4.	Poor	1 (1.23 %)
5.	Not Known	16 (19.75 %)
Total		**81 (100 %)**

6.16 Three-Factor Analysis of ICT's and Other Skills Assessment of Librarian

In this study, 43 components were used to measure the ICT and other skills of librarian to

see if and how they group together. Based on the component score coefficient matrix for various solutions, three-factor models were chosen, such that the variables did not overlap on any other factor. These three-factors of skills for librarian assessment were named as Excellent (Factor 1), Good (Factor 2) and Satisfactory (Factor 3) respectively. Table 15 shows a Varimax rotated factor analysis of the ICT and other skills tend to load on all three factors.

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalisation.

The factor loadings presented in Table 15 shows that, out of the 43 components, 18 had their highest

Table 15. Three factor-analyses for ICT and other skills assessment of librarian by varimax rotation (component score coefficient matrix)

S. No.	Skills in	Component		
		Excellent (%) (factor 1)	Good (%) (factor 2)	Satisfactory (%) (factor 3)
1.	Operating System – Windows	-.008	.025	.055
2.	Operating System – Unix	-.026	.004	.076
3.	Operating System – Linux	-.021	-.010	.122
4.	Operating System - Mac OS	-.050	-.004	.163
5.	Operating System - Sun Solaris	-.038	-.004	.137
6.	Programming Languages - C, C++& C#	-.033	.002	.142
7.	Programming Languages - JAVA	-.025	-.010	.145
8.	Programming Languages - PERL	-.023	-.030	.152
9.	Programming Languages - Pascal / Cobol	-.038	-.017	.144
10.	Programming Languages - .Net	.053	.007	-.028
11.	Programming Languages - Visual Basic	.066	-.026	.005
12.	Packages - MS-Word	.072	-.004	-.042
13.	Packages - MS-Excel	.091	-.022	-.033
14.	Packages - MS-Access	.073	-.010	-.014
15.	Packages - MS-Power Point	.082	-.011	-.051
16.	Packages - MS-Publishers	.085	-.020	-.012
17.	DBMS / RDBMS – Oracle	.073	.007	-.048
18.	DBMS / RDBMS - SQL / MySQL	.066	.024	-.070
19.	Other Utilities - Nero Start Smart	.101	-.044	-.033
20.	Other Utilities – WinZip	.110	-.045	-.040
21.	Other Utilities – WinRAR	.078	-.036	-.046
22.	Knowledge of Library Management Software	.049	.006	-.004
23.	Web Awareness - HTML / XML / PDF	.076	-.015	.010
24.	Web Awareness - Java Script	.084	-.020	.002
25.	Web Awareness - Visual Basic Script	.076	-.027	.017
26.	Web Awareness – Flash	.073	-.027	.022
27.	Other Online Facilities/Services - Search Engine	.001	.044	.049
28.	Other Online Facilities/Services - E-Mail	.006	.055	.019
29.	Other Online Facilities/Services - Online LIS Group	-.016	.077	.023
30.	Other Online Facilities/Services - Online LIS Networks	-.026	.103	.022
31.	Other Online Facilities/Services - Online LIS Forums	-.030	.100	.024
32.	Other Online Facilities/Services-Online LIS Blogs	-.027	.102	.023
33.	Other Online Facilities/Services-Subject gateways	-.030	.102	.020
34.	Other Online Facilities/Services-Electronic Document Delivery Service	.083	-.031	.009
35.	Other Online Facilities / Services - OPAC / Web OPAC	.086	-.030	-.001
36.	Technical Skills - Imaging Technology	.060	-.016	.018
37.	Technical Skills - Optical Character Recognition (OCR)	.056	-.014	.038
38.	Managerial Skills - Project Management	-.035	.122	-.028
39.	Managerial Skills - Resource Management	-.041	.126	-.022
40.	Managerial Skills - Systems Management	-.041	.079	-.019
41.	Managerial Skills - Fund Raising	-.017	.120	-.054
42.	Managerial Skills - Effective Leadership	-.028	.121	-.032
43.	Subject Skills (LIS)	-.018	.105	-.011

loadings on their expected factors, and three factors had loads of 0.10 or higher than any of the other factors. The robustness of the original solution seem quite surprising, given that these scales were developed from the responses of a sample in one community of one region (restricted to Rayalaseema Region in Andhra Pradesh). The factor loadings were examined to identify those items that met for factor-purity in the present sample. Loadings negatively correlate with good study results. Loadings of 0.10 or higher are highlighted which indicate that librarians lack skill in the respective item. On the whole, Table 16 provides information on the skills lacked by librarians.

- The greater part of librarians possess excellent knowledge in .Net (8.33 %) when compared to other programming languages.
- Knowledge of application software packages such as MS-Word, MS-Excel and MS-PowerPoint by LIS professionals is reasonably encouraging.
- A good number of LIS professionals possess knowledge in DBMS such as Oracle and SQL/ MySQL.
- Most of the librarians (49.78 %) express a satisfactory level of knowledge in library management software.

Table 16. Lack of ICT and related skills

S. No.	ICT's and Other Skills	Particulars
1.	Operating System	Linux, Mac OS, Sun Solaris,
2.	Programming Languages	C, C++& C#, JAVA, PERL, Pascal / COBOL
3.	Other Utilities	Nero Start Smart, WinZip,
4.	Knowledge of Other Online Facilities/Services	Online LIS Networks, Online LIS Forums, Online LIS Blogs, Online LIS Blogs, Subject gateways
5.	Managerial Skills	Project Management, Systems Management, Fund Raising, Effective Leadership

Table 17. Constraints on practice of ICT (Information and communication technology)

S. No.	Constraints	Type of institution			Total n=81	Rank
		Govt. (%)	Minority (%)	Private (%)		
1.	Library lacks infrastructural facility	2 (2.5 %)	1 (1.2 %)	33 (40.7 %)	36 (44.4 %)	**2**
2.	Lack of Commitment by institutional management	2 (2.5 %)	3 (3.7 %)	52 (64.2 %)	57 (70.4 %)	**1**
3.	Difficulties in training Library Staff with appropriate ICT Skills	4 (4.9 %)	2 (2.5 %)	23 (28.4 %)	29 (35.8 %)	**4**
4.	High cost of ICT facilities/components.	5 (6.2 %)	1 (1.2 %)	28 (34.6 %)	34 (42.0 %)	**3**
5.	Lack of professional recognition for library staff	1 (1.2 %)	1 (1.2 %)	26 (32.1 %)	28 (34.6 %)	**5**
6.	Overload of working hours	1 (1.2 %)	2 (2.5 %)	20 (24.7 %)	23 (28.4 %)	**6**

6.17 Constraints on ICT Practice by LIS Professionals

From Table 17, it is observed that lack of commitment by institutional management give the impression of being a significant constraint for librarians to apply ICT Skills (70.4 %) followed by the lack of updated ICT infrastructural facility in their library (44.4 %), and high cost of ICT facilities/ components (42 %).

7. FINDINGS

- The majority of the librarians are men (81.48 %) and only 18.52 % are women.
- About three fourth of the respondents are less than 40 years of age which show they are quite young exhibiting ability to work ardently.
- With regard to operating systems, librarians' possess awareness on Windows (20.4 %) and UNIX (8.4 %).
- The knowledge of other online utilities and services such as E-mail, online LIS group, network, blogs, forums are practically optimistic.
- Librarians lack better knowledge in technical skills such as optical character recognition and imaging technology.
- The main constraints faced by professionals in acquiring ICT skills are the poor infrastructural facilities and lack of cooperation from management.

8. SUGGESTIONS

Some suggestions are made below for upgrading ICT skills of LIS professionals.

- The library management needs to provide necessary scope and encouragement to promote the ICT skills of LIS Professionals.
- LIS Professionals have to be encouraged to attend seminars, workshops, ICT enhanced training program and Innovative ICT's performance skills.

- Educational universities offering courses in LIS need to change their syllabus focusing more on ICT's and providing practical classes to expertise in ICT Skills.
- The engineering educational institutions of Rayalaseema Region require building up the infrastructural amenities of libraries, so that ICT skills of LIS professionals can be better utilised.

9. CONCLUSIONS

Information and communication technology(ICT) influences the role of LIS professionals and the offer number of opportunities for professionals and personal development. Professionals with appropriate ICT skills are crucial for transforming traditional library to the electronic library. The present survey reveals that the LIS professionals serving in various engineering educational institutions of the Rayalaseema Region of Andhra Pradesh are mostly computer literate and have significant basic ICT skills to handle the library, still there is enough scope to develop their innovative ICT skills and to implement these skills in the library to provide new ICT-based library services.

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