Does Level of Knowledge Impact Librarians' Attitude Toward Information Technology (IT) Applications?

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Abstract

The paper presents librarians' attitudes toward information technology, their level of knowledge in IT, and their relationship with each other. Secondary data was collected through review of the relevant literature. Primary data was collected through a questionnaire survey of 244 librarians of libraries in Pakistan. The study revealed that awareness of the potential of IT, recency of attaining professional qualifications, and knowledge in IT had a significant relationship with librarians' attitudes. The study also revealed that librarians' level of knowledge in technology is a good predictor of their attitude toward application of information technology in libraries. Based on the findings, the paper puts forward recommendations to improve the librarians' attitudes toward IT applications in Pakistan and other developing countries

Keywords : Librarians' attitudes, Information technology, Attitudes,Librarians' knowledge, Pakistan, Developing countries, Information technology applications, Impact factor

0. Introduction

The rapid implementation of information technology in our society has changed and continue to change in all areas of our life. The utilization of information technology (IT) has become an indicator of a country's wealth level. Dr. Mahatir bin Mohamad, former Prime Minister of Malaysia has very rightly said that "In the information age that we are living in… there is today, no wealth developed country that is information-poor and no information-rich country that is poor and undeveloped." We are witnessing tremendous growth in the human knowledge due to advent of and application of information technologies in all spheres of human life. Technology has also provided the means of managing this knowledge through the strengthened capabilities recording, collecting, storing, processing and disseminating information.

Libraries globally have undergone a significant change in the past two decades due to the application of information technology in automated cataloguing, circulation systems, online information retrieval, electronic document delivery, and CD-ROM databases. Innovations such as expert systems, virtual collections, interactive web interfaces, virtual reference services, and personal web portals indicate greater changes since the start of the new millennium. There are visible, significant and fast changes occurring in librarianship, whereby digital and electronic libraries are being established to complement, and in some cases, to completely replace the traditional libraries (Abbas, 1997).

The role and attitudes of librarians in this change process has been central as they are the champions of introducing new technology-based library resources, services and systems. Successful implementation of information and other technologies is linked with enhancement of librarians' own knowledge and skills in the areas of information resource, tools, access modes, technology, management and their capabilities to integrate all these to provide effective and efficient library services.

Librarians in developed countries moved quickly to learn and adopt new information technologies. They raised their level of knowledge of new information technologies through continuing education programs, professional training, and through revisions in their library and information school curriculums. This

helped them to leverage the benefits of new technologies. Ultimately their libraries became well equipped with sufficient hardware, appropriate software and effective technology based materials. However, the situation with regard to IT usage in Pakistan and other developing countries is not encouraging. One of the problems hindering wider use of modern technologies is the low level of knowledge of library professionals and library administrators. Veteran educators and librarians have observed that in general librarians in developing countries were prone to implement information technologies, and librarians in Pakistan were not prepared to embrace the changes forced upon them by new technologies. Most of them were uncertain about IT applications in their libraries and the ultimate benefits to their parent organizations. They had no knowledge of what technologies to acquire, how to implement them, and what problems to solve. Important reasons for their ignorance and inability as reported by these authors were; lack of knowledge of appropriate technologies, and the skill to analyze and evaluate library automation projects and their implementation (Johnson, 1991) (Anwar, 1993), (Rehman, 1993), (Nair, 1998), (Haider, 1998), (Saeed, et al. 2000). The deplorable condition of libraries in many developing countries, especially in Pakistan is a true reflection of the level of librarians' IT knowledge, skills and attitudes.

This study attempts to measure the librarians' levels of knowledge of information technology, investigate their attitudes toward IT applications, and examine the relationship between librarians' IT knowledge and their attitudes toward IT applications in Pakistan.

1. Literature review

Information technology (IT) in this study refers to computer technology, hardware, software applications, multimedia applications, Internet, web applications, email, digital materials, electronic databases, virtual collections, remote access, and other telecommunications. A librarian is a full-time professional who runs the affairs of the library as incharge. Webster's dictionary defines knowledge as "(1) the fact or condition of knowing something with familiarity gained through experience of association: acquaintance with or understanding of a science, art, or technique," "(2) the fact or condition of being aware of something: the range of one's information or understanding," "(3) the circumstances or condition of apprehending truth or fact through reasoning," and "(4) the fact or condition of having information or being learned." Knowledge in this study has been defined as how many librarians knows about IT, what is their level of freshness of IT knowledge, and how much they have published about IT. Attitudes have been used to represent librarians' perceptions on the value attached to IT in libraries' technical processing, collection organization and user services. It represents the conceptual value of these technologies in the minds of the librarians, not the values of these technologies. The required level of knowledge can be identified and validated for current and future requirements and the potential of the state-of-the-art IT, the level of professional maturity, and national priorities.

The findings of a survey of more than 3,000 teachers ICT (Information and Communication Technologies) skills and knowledge, by Williams, et al. (1998) revealed that there is a significant correlation between levels of use, skills, familiarity, and knowledge of ICT and teachers' attitudes. Johnson (1991) observed that the major reason for failure of library automation projects in many developing countries is that librarians along with the funding agencies, plan the automation in a very simple manner without sufficient knowledge of the purchase of hardware, software, and power supply requirements.

Karen Finlay & Thomas Finlay (1996) sought to establish a connection between current knowledge and personality types in measuring librarians' attitude towards and use of the Internet. Along with the two individual characteristics, the research also measured other factors, including the level of support and the amount of training individuals received to enhance their knowledge or acceptance of the new technology. The researchers hypothesized that those who had a higher level of knowledge and a more innovative personality were likely to have a more positive attitude towards the innovation; however, the hypotheses

related to knowledge were supported, but the hypothesis that predicted innovativeness to relate positively to actual Internet use was not supported. The findings of a study by Janes (2002) revealed that reference librarians who had experience with digital reference tended to have more positive attitudes than those who had no experience.

Prior knowledge and experience with information technology may also be related to acceptance or rejection of technological innovations. Kerry and Hitz (1983) reported that previous computer experience could influence the acceptance of information systems. However, the direction of this influence may be problematic. They also found that too much experience might be as inhibiting as too little, as experienced users of computer systems may find it difficult to adjust to a new system and may possess exaggerated criteria for satisfaction. Lee (1988) studied the effect of knowledge and attitudes of 75 library directors and 350 professional librarians toward library automation, on automated programs in academic and research libraries in Taiwan. He revealed that knowledge and background of library directors and librarians was limited. Even then, they regarded library automation as a necessity and supported it. He found a significant relationship between attitudes toward library automation and the level of education, knowledge of computers, system analysis, reading books, and articles on computers, and work experience in library automation. Yaacob (1990) investigated the attitudes and perceptions of 120 librarians working in government-supported special libraries in Malaysia and examined the extent of application of IT, their use patterns, relationship between the librarians' attitudes toward IT and other variables. A significant relationship was determined between the librarians' attitudes and awareness of the potential of IT, and recency of attaining professional qualifications, and knowledge in IT. The study revealed that the head librarians' level of knowledge in technology was good predictor of the librarians' attitudes toward IT.

Al-Zahrani (2000) investigated the perceptions of 147 library professional and para-professional staff concerning information technology innovations and training in university libraries in Saudi Arabia. He found a significant relationship between respondents' educational background, experience in using information technology, and their perceptions about IT.

2. Methodology

The data regarding the librarians' level of knowledge and their attitudes toward IT was collected through a questionnaire survey of 244 librarians working in libraries in Pakistan. The respondents' level of knowledge in IT was examined through three variables, namely (1) extent of knowledge of technology, (2) rate of keeping abreast of IT, and (3) how much they had written or published about IT in libraries. All the three variables were measured using Likert scale from one to five, which represented the answers, no knowledge, little, moderate, substantial, and in-depth knowledge.

In order to measure the attitude variables, respondents were asked to indicate their level of agreement or disagreement regarding 41 IT attitude statements on a five-point Likert scale. Five points were allotted to the most favorable, and one point to the least favorable response. The index of the respondents' attitude was taken by adding the total score of the values. The higher score indicated the more favorable attitude, and the lower score indicated the less favorable attitude.

The hypothesis that a significant relationship exists between librarians, attitudes, and their level of IT knowledge was tested through various statistical tests (Pearson' Bivariate Correlations, Crosstabs, One-way ANOVA, etc.). Statistical tables were used to determine the chi-square value, and significance level. The Statistical Package for the Social Sciences (SPSS) was used to do the computation of the data and all appropriate analysis.

3. Findings regarding level of IT knowledge

The respondents' level of knowledge in IT was examined through measuring the extent of knowledge of technology, rate of keeping abreast of IT, and how much they had written or published about IT in libraries. Regarding the extent of knowledge of technology, the data in table 1 shows that 32 (13.5%) of the respondents had no knowledge in technology, 78 (33%) had little knowledge, while the majority, 97 (41%) of the respondents had a moderate level of knowledge in technology. Only 20 (8.5%) of the respondents had substantial, and 10 (4%) of the respondents had in-depth knowledge in technology. The mean score was 2.57, indicating that most respondents had between little and moderate level of knowledge in technology.

Respondents were asked to check the extent to which they kept abreast with new technological developments. The data in table 1 indicates that the majority of the respondents 84 (37%) had little awareness of new technological developments, 57 (25%) had a moderate level of awareness, and 24 (10%) had a substantial level of awareness about new technological developments. Only 12 (5%) of the respondents had an in-depth level of technological awareness, while 54 (23%) had never kept themselves abreast of new technologies. The mean score 2.38, indicates that the majority of the respondents had a low level of keeping abreast of new technologies.

The respondents ware asked to indicate the extent to which they had written or published about information technology in libraries. Table 1 shows that the majority of the respondents, 177 (76%) had not written or published about information technology in libraries. Thirty-seven (16%) respondents had little written contribution, 13 (6%) had a moderate level of contribution, no one had substantially contributed, while only 6 (3 %) had an in-depth level of contribution to literature about information technology in libraries. The mean score 1.37 indicated that the majority of the librarians had not contributed toward the written or published literature about information technology in libraries.

Table 1 Respondents' level of IT knowledge

Level of knowledge	Extent of technology		Awareness of new technologies		Published about IT	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
None	32	13.5	54	23.4	177	76.0
Little	78	32.9	84	36.3	37	15.9
Moderate	97	40.9	57	24.7	13	5.6
Substantial	20	8.4	24	10.4	0	0
In-depth	10	4.2	12	5.2	6	2.6
Total	237	100.0	231	100.0	233	100.0
Mean score		2.57		2.38		1.37

The average mean score of the three dimensions of knowledge of IT (2.57, 2.38, and 1.37) indicates that the majority of the respondents had between little and moderate level of knowledge of information technologies.

4. Librarians' attitudes toward Information Technology

An attitude in this study is defined as perceptions, beliefs, and opinions of an individual librarian toward the impact, cost and resource allocation, and general effects of IT applications in libraries in Pakistan. In order to measure the attitude variables, respondents were asked to indicate one of the following as their level of agreement or disagreement regarding the attitude statements.

- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

Five points were allotted to the most favorable, and one point to the least favorable response. The index of the respondents' attitude was taken by adding the total score of the values. The higher score indicated the more favorable attitude, and the lower score indicated the less favorable attitude. Attitude statements were divided into three parts. The first part consisted of seventeen statements eliciting librarians' attitudes toward impact of IT, the second part dealt with seven statements regarding librarians' attitudes toward IT cost and resources allocation, and the final part dealt with librarians' responses to five staff and user IT training statements. Data in tables 2, 3, & 4 indicates respondents' agreement or disagreement with the information technology statements. The number and percentage of undecided responses have been ignored in the tables as being self-explanatory.

5. Attitudes about impact of IT

Data in table 2 presents that a majority, 200 (87%) respondents agreed with the statement that each year IT offers more effective ways to carry out library operations. More than 81 percent of the respondents agreed that IT helps make specific information available that otherwise might not be available, only 6 percent of the respondents disagreed with the statement. The librarians were divided on the statement that changes occurring due to IT application are out of control of librarians so they have to adjust accordingly.

The majority, 189 (82%) respondents agreed that the online databases provide more up to date information than the conventional catalogues and indexes. Seventy-Seven (33%) respondents disagreed with the statement that card catalogue can be modified more easily than OPAC, 29 (13%) were undecided, while 124 (54%) respondents agreed with the statement. The librarians were divided over the statement that all levels of staff can easily work with IT based systems.

Almost 86 percent (198) of the respondents believed that IT helps make quick and correct decisions; only 6 percent (14) did not believe the statement. As summarized below, 104 (45%) respondents agreed that extensive use of IT has created job fears amongst librarians; a significant number, 48 (21%) respondents were undecided, while 79 (34%) respondents disagreed with the statement. One hundred and eight (47%) respondents agreed that automated acquisitions is not feasible for Pakistani libraries, 88 (38) disagreed with this statement. The majority, 146 (63%) respondents showed disagreement that computerized library inventory (accessioning) is not acceptable in Pakistani libraries due to accounts and auditing requirements of the country.

A significant number, 147 (60%) respondents believed that IT will not appreciably reduce the number of library staff, while 68 (29%) did not believe the statement. Almost all, 198 (86%) respondents believed that computers help eliminate repetitive and clerical functions. The majority, 191 (87%) respondents agreed that IT enables most effective ways of resource sharing; only 25 (11%) respondents did not believe this statement. More than 103 (46%) respondents believed that data storage on computer is highly risky in Pakistani libraries, while 96 (41%) did not agree with the statement.

In response to a statement, that information retrieval is easier through printed resources than online resources, of those who responded 118 (51%) agreed, while 89 (39%) did not favor the statement. Respondents were almost equally divided on the statement that data retrieved through print resources is

more authentic and reliable as compared to data retrieved through computer, Internet, and other information technology based resources. Only fifty-nine percent of the respondents agreed that computers create health and environment problems.

The average mean score 3.5024 for the above seventeen statements revealed that librarians showed positive attitudes toward the impact of IT. The overall positive attitude of respondents toward impact of IT was further reinforced, given that most respondents showed a low level of agreement (around or less than 3) with negative statements

Table 2 Librarians' attitudes toward impact of IT

Attitude Statement	N	Unfavorable	Favorable	Mean
Computerized library inventory is not acceptable to accounts & audit in Pakistan	231	146 (63%)	56 (24%)	2.44
Data retrieved through print resources is authentic	231	99 (43%)	100 (43%)	2.94
Data storage on computers is highly risky in Pakistani libraries	231	96 (41%)	103 (45%)	2.97
Automated acquisition is not feasible for Pakistani libraries	231	88 (38%)	108 (47%)	3.01
Extensive use of IT has created job fears amongst librarians	231	79 (34%)	104 (45%)	3.06
Information retrieval is easy through printed resources	230	89 (39%)	118 (51%)	3.18
Card catalog can be modified more easily than OPAC	230	77 (33%)	124 (54%)	3.23
Computer creates health and environmental problems	231	67 (29%)	135 (58%)	3.33
ll levels of staff can easily work with IT based systems	231	78 (34%)	137 (59%)	3.41
IT will not appreciably reduce the number of library staff	231	68 (29%)	138 (60%)	3.41
Changes occurring due to IT application are out of control of librarians	231	49 (21%)	157 (68%)	3.69
IT helps provide specific information available	231	15 (6%)	188 (81%)	4.11
IT enables most effective ways of resource sharing	230	25 (11%)	191 (83%)	4.12
Online databases provide more up-to-date information	230	15 (6%)	189 (82%)	4.14
Each year IT offers more efficient ways to carry library operations	231	21 (9%)	200 (87%)	4.16
Computers help eliminate repetitive and clerical functions	231	18 (8%)	198 (86%)	4.16
IT helps make quick and correct decisions	230	14 (6%)	198 (86%)	4.17

6. Librarians' attitudes toward IT costs and resource allocation

The results in table 3 indicate that more than 90% respondents agreed with the last 3 statements on IT resource allocation. However, respondents were divided with the statements that cost of IT tools is too high for their worth for Pakistani libraries; the expenditure of IT maintenance and supplies is very high as compared to printed resources; and cost was a major factor for not buying IT for libraries. A significant number, 137 (60%) respondents believed that IT is still a luxury for Pakistani libraries, while 79 (34%) did not agree with this statement. Mean scores on librarians' attitudes on IT cost and resources allocation were generally high. The mean level of agreement was positively high (more than 4) for the last three statements mentioned in the table below. The overall positive attitude of respondents toward IT cost and resource allocation was further reinforced, given that most respondents showed a low level of agreement with negative statements.

Table 3 Librarians attitudes towards cost and resource allocation for IT

Attitude Statement	N	Unfavorable	Favorable	Mean
Cost of IT tools is too high for their worth for Pakistani libraries	230	108 (47%)	96 (42%)	2.87
Cost is a major factor for not buying IT for libraries	230	77 (33%)	121 (43%)	3.30
IT is still a luxury for Pakistani libraries	229	79 (34%)	137 (60%)	3.34
IT maintenance expenditure is very high	230	41 (18%)	165 (72%)	3.70
Each year librarians should increase IT expenditure	230	10 (5%)	208 (90%)	4.21
Extra fund allocations should be spent on IT	230	8 (3%)	216 (94%)	4.31
Training fund allocation is must for any new technology	230	7 (3%)	215 (93%)	4.35

6.1 Librarians' attitudes toward IT training for staff and users

The data in table 4 indicates that almost all, 97 percent of the respondents agreed that attainment of theoretical and practical IT knowledge should be a component of library education in Pakistan. The mean score 4.57 indicates strong agreement of the respondents with this statement.

Almost all, 94 percent of the respondents agreed that all levels of staff involved in IT applications should be given on-going education and training through workshops and courses. Only 8 respondents disagreed, and 2 remained undecided about this statement. The majority, 219 (94%) respondents believed that it is essential for librarians to arrange instructional programs for users whenever they introduce or receive new electronic systems. Only 6 (2%) did not agree, and 8 (3%) respondents had no opinion about this statement. The mean score 4.33 indicates respondents' level of agreement with this statement. Respondents were asked to show their agreement or disagreement with the level and quality of library automation training provided by Pakistan Library Association (PLA) computer training center. Table 4.35 reveals that 101 (43%) respondents believed that the training provided by Pakistan Library Association (PLA) computer training center is of high quality and very effective, 35 (15%) had no opinion, while 95 (41%) respondents believed that the standard and quality of the training currently provided needed to be raised.

Mean scores of 4.57, 4.44, and 4.33 revealed librarians' positive attitudes toward IT training for staff and users.

Table 4 Librarians' attitudes toward IT training for staff and users

Attitude Statement	N	Unfavorable	Favorable	Mean
Training provided by (PLA) Pakistan Library Association, Computer Centers is of quality and very effective	231	95 (41%)	101 (44%)	3.04
User must be given orientation of new electronic systems	231	6 (3%)	217 (94%)	4.33
Staff involved in IT should be given training	231	8 (3%)	221 (96%)	4.44
Attainment of theoretical and practical IT knowledge should be a component of library education in Pakistan	232	4 (2%)	226 (97%)	4.57

The average mean scores given against each group of statements indicate the respondents' average level of agreement with the particular group of statements. The overall mean score of 3.7414 indicates that respondents showed positive attitudes towards IT statements. The overall positive attitudes of librarians was further reinforced given that most of the respondents showed a low level of agreement with negative statements.

Table 5 Summary of respondents' attitudes toward information technology

IT Statement Groups	N	Mean
Impact of IT	231	3.5024
IT Cost and Resource Allocation	230	3.7265
IT Training	232	4.0963
General IT Statements	232	3.6405
Overall IT Attitudes	231	3.7414

7. Analysis of relationship

Pearson's coefficient of correlation was run to test the hypothesis that a significant positive relationship exists between the librarians' attitudes toward information technology and their level of knowledge of information technology. The librarians level of knowledge of IT was assessed through three dimensions, namely extent of knowledge of technology, rate of keeping abreast of information technology, and how much they have written or published about information technology in libraries. All the three variables were measured using Likert scale from one to five. The mean score of all the three dimensions were computed to derive the librarians' level of knowledge of IT.

The librarians' information technology attitudes were assessed using 41 IT statements, measured on a five-point Likert scale. The mean scores of each of the IT statements were computed to get average IT attitudes. Pearson's Coefficient of correlation was computed for assessing the relationship between averages of IT attitudes and librarians' level of knowledge of IT.

Table 6 Average IT attitudes and level of IT knowledge

		Average IT Attitudes	Level of IT Knowledge
Average IT Attitudes	Pearson Correlation Sig. (2 tailed) N	1.000 2.33	1.72** 0.009 229
Level of IT Knowledge	Pearson Correlation Sig. (2-tailed) N	172** .009 229	1.000 237

** Correlation is significant at the 0.01 level (2-tailed)

The two constructs 'average IT attitudes' by 'level of IT knowledge' were positively correlated, with a correlation coefficient of .172, significant at 0.01 levels.

8. Conclusions

The findings of the study confirmed earlier observations of library scholars that the majority of the librarians in Pakistan still lack necessary skills to plan, use and implement IT, as over 85 percent of the respondents had only a moderate level of IT awareness, and more than 75 percent of the respondents had made no written or published contribution about IT in libraries. The librarians showed overall positive attitudes toward IT as the mean scores for each of the four groups of IT statements as well as for the overall IT attitudes were higher than 3.7 on a five-point scale. The findings with regard to the overall positive attitude of the librarians toward IT, was further supported by the fact that the respondents showed a low level of agreement with negative statements. The study confirmed the hypothesis that a significant positive relationship exists between librarians' attitude toward information technology and their level of knowledge of information technology. Pearson's correlation coefficient for the two constructs was .172, significant at 0.01 levels, evidencing a positive relationship between 'average IT attitudes' and 'level of IT knowledge.' The significant relationship between librarians' level of knowledge in IT and their attitudes toward IT is an indication that prior experience and knowledge has a significant relationship with attitudes toward IT. This implies that librarians' require continuing education and exposure to increase their level of knowledge of new technologies. In line with the findings of Yaacob (1990), this study found that librarians were strong change agents in impelling libraries to incorporate changes enabled by new technologies. Their attitudes could be made more positive given adequate training, opportunities to participate in professional workshops, seminars, and environment conducive to read, research, and publish regarding information technology. This in return would certainly raise the use of appropriate information technologies in libraries.

9. Recommendations

The researcher found that serious efforts are required to raise the librarians' level of knowledge in information technology. The following steps can be applied in Pakistan and other developing countries to make the librarians more knowledgeable about new technologies and to make their attitudes more positive to introduce new information technologies:

1. A significant effort is required to increase awareness of new technologies among the librarians in Pakistan. Librarians should be more proactive in reading; discussing and publishing IT related issues and experiences.
2. There is a need to consider compulsory internship for every graduating librarian.
3. A separate budget should be allocated for training whenever a new technology is acquired even if it is highly expensive. Librarians should initiate orientation programs for staff and users for newly implemented systems and technologies.
4. Information technology should be a core component of formal library education in Pakistan. Library Schools need to upgrade their syllabi regularly according to the job market and future requirements.
5. The need was also determined for librarians to document their experiences, and to subscribe to professional magazines to update their knowledge, to take part in professional activities, and to participate in Internet discussion groups.
6. More emphasis should be placed on improving librarians' attitudes toward technology. Librarians' knowledge in IT, experience in computer use, level of awareness of technologies, recency in IT training are key factors impacting their attitudes toward information technology. Library administrators need to address these factors while planning and implementing any IT based project in libraries.

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