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Developing an Instrument for the Validation of Competencies: The Case of Medical Librarians

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Developing an Instrument for the Validation of Competencies:

The Case of Medical Librarians

by

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Abstract

Reliable and valid tests / instruments are the foundation of good research. They need to be developed carefully following acceptable scholarly procedures. The procedure for developing a test / instrument is a long and complicated one. This paper describes in detail the process of developing an instrument for the identification and validation of competencies required for medical librarians. The understanding of the process of designing an instrument is important as it helps in assessing its validity and reliability. Therefore, this paper describes in detail the various steps that were undertaken to develop the instrument.

Keywords: Test development; Instrument development; Competencies; Medical librarians’ Pakistan

Introduction

We, the authors of this paper, planned to conduct a study of competencies required for medical librarians. We needed a validated and suitable instrument that could be confidently used in this research. An extensive search through various databases and the published research did not yield one which we could use. We knew that reliable and valid tests / instruments were the foundation of good research and that weak instruments would result in weak research. Our failure in finding a reliable instrument led us to decide to develop a new one. We also understood that the procedure for developing a new test / instrument was a long and a complicated one.

We went through that long and arduous process and developed an instrument which has already been published (Catalano, 2016, p. 109-113). The understanding of the process of designing an instrument is important as it helps in assessing its validity and reliability. This paper describes meticulously the process of developing the instrument that we used for the identification and validation of competencies required by medical librarians. It provides full details of the various steps that were undertaken to develop the instrument. The results of our research were published in 2012 (Ullah & Anwar, 2012). The present paper is being published with the intention of providing a roadmap for those who need to develop a new instrument for their research.

Previous work on competencies

Earlier work on competencies has been ably reviewed by Roper and Mayfield (1993a). The following paragraphs will briefly review some of the previous efforts made for the identification of competencies for medical librarians only.
Bowden, Bierschenk and Olivier (1989) conducted a survey in 1988 of the members of the Association of Academic Health Sciences Library Directors (AAHSLD) in order to determine important professional skills and personal qualities desired by the employers of fresh graduates. The instrument used consisted of nine skills and 13 personal traits using “very important”, “important” and “not important” as the choices. It is not known how these skills and traits were identified. Bowden and Olivier (1995) repeated the same survey in 1992. It was found that ‘problem solving/analytical skills’, ‘microcomputer skills’, ‘bibliographic instruction skills’, ‘online searching skills’, ‘reference/information service skills’, and ‘MEDLINE searching skills’ were rated as ‘very important’. The following personal qualities were considered as ‘very important’: ‘communication skills’, ‘enthusiasm’, ‘self-esteem’, ‘flexibility’, ‘service orientation’, ‘willingness to be a team player’, and ‘interpersonal skills’.

Roper and Mayfield (1993a) report the results of a survey of knowledge and skills in the health information sciences conducted by the Medical Library Association using a sample of 750 health sciences librarians out of which 375 (50%) returned the questionnaire. The survey instrument listed 63 knowledge-bases categorizing these in seven areas derived from the survey of literature and expert review. The respondents were asked to indicate the importance of each knowledge or skill for effective performance on a 5-point Likert-type scale from ‘essential’ to ‘no importance’. The results are reported in five tables indicating the level of importance of various competencies. They conclude that “If health sciences librarians are not willing to take on the responsibilities which their clientele feel are appropriate, they will be replaced by other professionals who can and will” (p. 38). A fuller version of this report was published in the Bulletin of the Medical Library Association (Roper & Mayfield, 1993b).

Giuse, et al. (1997), using a four-step needs assessment process, designed a survey instrument consisting of 96 competencies divided into 13 categories (the appendix actually lists 98 items). It was administered to 300 respondents (150 librarians and 150 library users) with 131 (77 librarians and 54 users) responding. The response rate was 43.7 per cent. Each skill was rated for its importance on a 1-7 point Likert-type scale. It was found that “all of the knowledge and skills in their categorical groupings were rated above the Likert mean and, in fact, often exceeded the mean considerably” (p. 62). These competencies are dated now.

A study on the role of the clinical librarian using content analysis of job advertisements, job titles, and duties, using a structured questionnaire administered to a sample of five practicing librarians, followed by an interview was conducted in the UK (Sargeant & Harrison, 2004; Harrison & Sargeant, 2004). It was discovered that there was “a moderate degree of congruence
between recruitment specifications and working activities of clinical librarians” (Sargeant & Harrison, 2004, p. 180). This is an interesting study but limited by a small sample. Robinson et al (2005) analyzed the previous literature to identify a variety of competencies and prepared a model consisting of: Professional competency (Content knowledge and Technical knowledge), Teaching skills (Professionalism, Basis of training, Design, and Evaluation), and E-learning skills (Creation and Delivery).

The roles of academic medical librarians in Malaysia were studied by using face-to-face interviews of 18 respondents (Santra, 2007). The focus was placed on the respondents’ current activities, awareness of the skills and knowledge of emerging roles, and their education and training.

The Medical Library Association (2007) in its educational policy statement listed seven areas under ‘Professional Competencies for Health Sciences Librarians’, each with several sub-areas, as follows (p. 4-5):

1. Understand the health sciences and health care environment and the policies, issues, and trends that impact that environment
2. Know and understand the application of leadership, finance, communication, and management theory and techniques
3. Understand the principles and practices related to providing information services to meet users’ needs
4. Have the ability to manage health information resources in a broad range of formats
5. Understand and use technology and systems to manage all forms of information
6. Understand curricular design and instruction and have the ability to teach ways to access, organize, and use information
7. Understand scientific research methods and have the ability to critically examine and filter research literature from many related disciplines

These areas are followed by a set of recommendations for various agencies (p. 6), a list of personal attributes that contribute to success (p. 9), and then a long listing of ‘health sciences information knowledge and skills’ (p. 10-13). The last section could become the basis of developing competency statements.
The published literature indicated that a variety of competencies were dealt with in many publications. However, none of these sources provided a comprehensive and satisfactory listing of competencies that we could use. It was felt that there was an urgent need for the preparation of an up-to-date and comprehensive checklist of validated competencies for medical librarians.

**Instrument development**

The survey instrument used for this study was designed using an extensive review of published literature, expert scrutiny and a pilot study as detailed below.

The scanning of a large amount of literature resulted in a large number of raw competency statements. These statements were listed, edited, sorted, compared, and merged to form the first draft of potential competencies. This list of raw statements and the sources were carefully and critically reviewed by the researchers for refining of statements and selection of credible sources. This process resulted in a tentative list of 133 items which were derived from 24 sources.

The 133 tentative competencies were initially grouped into the following eight subject domains: Health sciences environment and concepts (14 statements), management theory and techniques (28 statements), health sciences reference and information services (14 statements), health sciences resource management (18 statements), information systems and technologies (15 statements), instruction and teaching (14 statements), research methods (10 statements), and general and personal competencies (20 statements). Each of these 133 raw statements, followed by the sources derived from, is listed in Appendix A. Full bibliographical details of the 24 sources with the number of times each was used are listed in Appendix B. These statements were used as a raw list for critical review and study by the researchers with a view to reduce their number.

**Draft Instrument**

The raw list was revised several times in order to merge closely related and similar statements to reduce their number. The statements were merged keeping in mind that these should appear to be bona fide and natural units. This intensive exercise resulted in a draft instrument containing 87 competency statements which was submitted to the experts. Each statement was provided with a 5-point Likert scale and a column for comments by the panel of experts. Several rows were left blank at the end of each subject area if any of the experts might like to add another competency.
Expert Scrutiny

The draft instrument was submitted to the panel of six experts along with a covering letter. The panel consisted of two LIS faculty members (having a qualification of PhD and research contribution in the field of LIS competencies), two ex-library coordinators (medical faculty members having a research degree and contribution to the medical literature), and two retired medical librarians for content validity. The list was revised in response to feedback received from this panel. Keeping in view the comments of the panel of experts, some competencies were added and some were removed. The language of competency statements was also improved in light of changes suggested by the panel. The resulting list was submitted to them again for final examination.

The Scale Used

The respondents were asked to rate the importance of each competency statement on a 5-point Likert scale from 5 to 1, considering: 5 = Highly Important; 4 = Very Important; 3 = Important; 2 = Somewhat Important; 1 = Not Important. For validation purpose the scale value of 3 was fixed as the cut-off point. A competency was considered “important” if it received an average mean score of greater than 3.00.

Pilot Study

The revised instrument approved by the panel of experts was tested in a pilot study using four medical librarians and four library coordinators, who were not part of the respondents of the study. A covering letter was also sent along with the pilot instrument requesting the participants to make comments if necessary.

The pilot instrument was amended in response to ambiguities identified by the participants of the pilot study. They also identified some technical and professional terms used in the instrument which were explained in common language. The pilot study resulted in the final instrument consisting of 84 competency statements which were categorized into the following eight subject domains: (1) Health sciences environment (9 statements); (2) Management theory and techniques (19 statements); (3) Health sciences reference and information services (10 statements); (4) Management of health information resources (10 statements); (5) Information systems and technologies (11 statements); (6) User education (7 statements); (7) Research methods (7 statements); and (8) General and personal competencies (11 statements).

The Study
An investigation to identify and validate competencies for medical librarians was carried out by Ullah and Anwar (2012). An instrument consisting of 84 competency statements divided into eight subject domains (Table 1) prepared after an extensive review of literature published during past 25 years, expert scrutiny, and pilot testing was used on 67 medical librarians and 63 medical supervisors of libraries in Pakistan. A 5-point Likert scale (5 ‘highly important’ to 1 ‘not important’) was used to obtain the opinions of the respondents on each competency. Of the 84 competencies, 83 were validated by the medical librarians and 80 by the medical library supervisors. All 84 competencies are listed in Appendix C arranged in order of decreasing mean value scored by the head librarians. Each statement provides the mean value, standard deviation and rank of head librarians followed by the same information for library coordinators. The values of the four statements that were not validated are not listed.

These 84 statements can be grouped into subject domains (Table 1) by using the code following each statement. These statements should be shuffled before using this instrument for research. Full details of the study are given in Ullah and Anwar (2012). The full instrument has been published in Catalano (2016).

Reliability of the Instrument

After collection of data the internal consistency of the 84 statements was tested using Cronbach’s alpha (CA). The CA value of 84 statements was .964 for head librarians, .950 for library coordinators, and .960 for both combined. The CA values for the eight subject categories of statements varied from .887 to .786 for head librarians, from .889 to .677 for library coordinators, and .895 to .760 for both combined. The CA values for the 80 validated statements were .964 for head librarians, .949 for library coordinators, and .959 for both combined. The CA values reported above indicate a very high level of internal consistency of the instrument.

To assess the degree of internal consistency among competency statements Cronbach’s alpha were calculated using SPSS. Table 1 presents the Cronbach’s alpha of head librarians, library coordinators as well overall for the eight subject categories separately. It shows that responses of head librarians were internally consistent. The responses of library coordinators were also internally consistent for all categories except health sciences environment category (Cronbach’s Alpha = .677) which was not. This table also presents the Cronbach’s alpha value for all 84 statements (Cronbach’s Alpha = .960) and 80 statements (Cronbach’s Alpha = .959) validated by both groups of respondents. It shows that these were highly internally consistent.
Table 1: Statistical Results for Reliability analysis

<table>
<thead>
<tr>
<th>S. No</th>
<th>Subject Domains</th>
<th>Cronbach’s alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Head Librarians</td>
</tr>
<tr>
<td>1</td>
<td>Health Sciences Environment (9 statements)</td>
<td>.803</td>
</tr>
<tr>
<td>2</td>
<td>Management Theory &amp; Techniques (19 statements)</td>
<td>.887</td>
</tr>
<tr>
<td>3</td>
<td>Health sciences reference and information services (10 statements)</td>
<td>.836</td>
</tr>
<tr>
<td>4</td>
<td>Management of health information resources (10 statements)</td>
<td>.786</td>
</tr>
<tr>
<td>5</td>
<td>Information systems and technologies (11 statements)</td>
<td>.864</td>
</tr>
<tr>
<td>6</td>
<td>User education (7 statements)</td>
<td>.863</td>
</tr>
<tr>
<td>7</td>
<td>Research methods (7 statements)</td>
<td>.879</td>
</tr>
<tr>
<td>8</td>
<td>General and personal competencies (11 statements)</td>
<td>.855</td>
</tr>
<tr>
<td></td>
<td>All (84 statements)</td>
<td>.964</td>
</tr>
<tr>
<td></td>
<td>Validated by both groups of respondents (80 statements)</td>
<td>.964</td>
</tr>
</tbody>
</table>

Conclusion

The instrument developed consists of 84 competency statements categorized into eight subject domains. Each statement has 5-point Likert scale for validation. The instrument was developed after extensive literature review, scrutiny by a panel of experts and pilot testing which provided high degree of construct and content validity. It was used on 67 medical librarians and 63 medical supervisors of libraries in Pakistan for validation (Ullah & Anwar, 2012). This instrument has acceptable level of reliability. It can be used in different areas to validate the identified competencies. The process described above can be used by researchers to design and validate competency instruments for various domains.

References


### Appendix A

**Raw Competency Statements and the Sources Used for their Identification**

#### 1. Health Sciences Environment and Concepts

<table>
<thead>
<tr>
<th>Competency statement</th>
<th>Sources derived from</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1 Familiarity with various health and health related associations and organization</td>
<td>Medical Library Association, 2007; Roper &amp; Mayfield, 1993a</td>
</tr>
<tr>
<td>1.2 Awareness of the institution’s information policies</td>
<td>Medical Library Association, 2007</td>
</tr>
<tr>
<td>1.3 Knowledge of education and training patterns of medical profession</td>
<td>Medical Library Association, 2007; Roper &amp; Mayfield, 1993a</td>
</tr>
<tr>
<td>1.4 Knowledge of organization of health sciences literature</td>
<td>Giuse, et al, 1997; Roper &amp; Mayfield, 1993a</td>
</tr>
<tr>
<td>1.5 Knowledge of health policies and programs</td>
<td>Medical Library Association, 2007</td>
</tr>
<tr>
<td>1.6 Knowledge of accreditation standards and issues</td>
<td>Buttler &amp; Du Mont, 1996</td>
</tr>
<tr>
<td>1.7 Knowledge of health sciences professions and specialties</td>
<td>Giuse, et al, 1997; Medical Library Association, 2007; Roper &amp; Mayfield, 1993a</td>
</tr>
<tr>
<td>1.8 Knowledge of health care system, trends and structure</td>
<td>Medical Library Association, 2007; Roper &amp; Mayfield, 1993a</td>
</tr>
<tr>
<td>1.9 Knowledge of health care ethics and legal issues</td>
<td>Homan, Foundation &amp; McGowen, 2002; Medical Library Association, 2007</td>
</tr>
<tr>
<td>1.10 Knowledge of health care economics</td>
<td>Homan, Foundation &amp; McGowen, 2002; Medical Library Association, 2007</td>
</tr>
<tr>
<td>1.11 Knowledge of medical sociology</td>
<td>Homan, Foundation &amp; McGowen, 2002</td>
</tr>
<tr>
<td>1.12 Knowledge of meanings of medical terms</td>
<td>Guise, et al, 1997; Harrison &amp; Sargeant, 2004; Roper &amp; Mayfield, 1993a</td>
</tr>
<tr>
<td>1.13 Some knowledge of anatomy and physiology</td>
<td>Harrison &amp; Sargeant, 2004</td>
</tr>
<tr>
<td>1.14 Basic knowledge of epidemiology</td>
<td>Harrison &amp; Sargeant, 2004; Scherrer &amp; Jacobson, 2002</td>
</tr>
</tbody>
</table>

#### 2. Management Theory and Techniques

<table>
<thead>
<tr>
<th>Competency statement</th>
<th>Sources derived from</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1 Preparing library budget and their fiscal management</td>
<td>Bryant &amp; Poustie, 2001; Griffiths &amp; King, 1986; Khoo, 2005; Larsen, 2006; Mahmood, 2002; Medical Library Association, 2007; Rehman, 2000; Roper &amp; Mayfield, 1993a, 1993b</td>
</tr>
<tr>
<td>2.2 Recruit, select, train, supervise, and evaluate the staff</td>
<td>Guise, et al, 1997; Griffiths &amp; King, 1986; Khoo, 2005; Larsen, 2006; Mahmood, 2002; Medical Library Association, 2007; Rehman, 2000; Roper &amp; Mayfield, 1993a; Western Council of State Libraries, 2006</td>
</tr>
<tr>
<td>2.3 Understanding of project development and management</td>
<td>Harrison &amp; Sargeant, 2004; Khoo, 2005; Larsen, 2006; Roper &amp; Mayfield, 1993a, 1993b; Western Council of State Libraries, 2006;</td>
</tr>
<tr>
<td>2.4 Public relation and Interpersonal relations</td>
<td>Mahmood, 2002; Roper &amp; Mayfield, 1993a, 1993b</td>
</tr>
<tr>
<td>2.5 Marketing and promotion of library services and resources</td>
<td>Bryant &amp; Poustie, 2001; Mahmood, 2002; Roper &amp; Mayfield, 1993b; Western Council of State Libraries, 2006</td>
</tr>
<tr>
<td>2.6 Evaluating library performance qualitatively and quantitatively</td>
<td>Griffiths &amp; King, 1986; Mahmood, 2002</td>
</tr>
<tr>
<td>2.7 Planning</td>
<td>Khoo, 2005; Roper &amp; Mayfield, 1993a; Western Council of</td>
</tr>
<tr>
<td>Competency statement</td>
<td>Sources derived from</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>2.8 Make decision and recommendations based on available information (Decision making)</td>
<td>Griffiths &amp; King, 1986; Khoo, 2005; Roper &amp; Mayfield, 1993a</td>
</tr>
<tr>
<td>2.9 Organizing extension activities for users like displays, exhibitions, talks, seminars, etc.</td>
<td>Mahmood, 2002</td>
</tr>
<tr>
<td>2.10 Time management and setting priorities</td>
<td>Bryant &amp; Poustie, 2001; Griffiths &amp; King, 1986; Larsen, 2006; Rehman, 2000; Roper &amp; Mayfield, 1993a; Western Council of State Libraries, 2006</td>
</tr>
<tr>
<td>2.11 Knowledge management in libraries</td>
<td>Khoo, 2005; Mahmood, 2002; Reagon, 2005</td>
</tr>
<tr>
<td>2.12 Change management by integrating library resources and services with environmental change</td>
<td>Khoo, 2005; Mahmood, 2002; Western Council of State Libraries, 2006</td>
</tr>
<tr>
<td>2.13 Conduct effective meetings</td>
<td>Griffiths &amp; King, 1986; Larsen, 2006; Western Council of State Libraries, 2006</td>
</tr>
<tr>
<td>2.14 Fund raising and proposal writing</td>
<td>Guise, et al, 1997; Medical Library Association, 2007; Roper &amp; Mayfield, 1993a</td>
</tr>
<tr>
<td>2.15 Facilities planning and space allocation</td>
<td>Khoo, 2005; Medical Library Association, 2007; Roper &amp; Mayfield, 1993a</td>
</tr>
<tr>
<td>2.16 Apply national and international library standards</td>
<td>Medical Library Association, 2007; Western Council of State Libraries, 2006</td>
</tr>
<tr>
<td>2.17 Able to do lobbying and advocacy and play organization politics</td>
<td>Bryant &amp; Poustie, 2001</td>
</tr>
<tr>
<td>2.18 Environment scanning/Environment sensitivity</td>
<td>Bryant &amp; Poustie, 2001; Khoo, 2005; Medical Library Association, 2007; Roper &amp; Mayfield, 1993a</td>
</tr>
<tr>
<td>2.19 Coordinating</td>
<td>Roper &amp; Mayfield, 1993a</td>
</tr>
<tr>
<td>2.20 Facilitating</td>
<td>Roper &amp; Mayfield, 1993a</td>
</tr>
<tr>
<td>2.21 Goal orientation</td>
<td>Roper &amp; Mayfield, 1993a</td>
</tr>
<tr>
<td>2.22 Compose regular reports to the higher authorities regarding the library progress</td>
<td>Western Council of State Libraries, 2006</td>
</tr>
<tr>
<td>2.23 Develop &amp; maintain partnerships with other organizations/institutions</td>
<td>Medical Library Association, 2007; Roper &amp; Mayfield, 1993a; Western Council of State Libraries, 2006</td>
</tr>
<tr>
<td>2.24 Provide input into the architectural planning of library facilities</td>
<td>Western Council of State Libraries, 2006</td>
</tr>
<tr>
<td>2.25 Negotiate contracts/agreements</td>
<td>Griffiths &amp; King, 1986; Khoo, 2005; Larsen, 2006</td>
</tr>
<tr>
<td>2.26 Formulate and apply policies and procedures effecting library and information services</td>
<td>Mahmood, 2002; Rehman, 2000; Roper &amp; Mayfield, 1993a</td>
</tr>
<tr>
<td>2.27 Apply critical thinking skills to library problems</td>
<td>Griffiths &amp; King, 1986; Reagon, 2005; Roper &amp; Mayfield, 1993a</td>
</tr>
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</table>
### 3. Health Sciences Reference and Information Services

<table>
<thead>
<tr>
<th>Competency statement</th>
<th>Sources derived from</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1 Developing a sound knowledge of ready reference source</td>
<td>Mahmood, 2002</td>
</tr>
<tr>
<td>3.2 Reference interview skill (conduct an appropriate reference interview)</td>
<td>Buttlar &amp; Du Mont, 1996; Griffiths &amp; King, 1986; Khoo, 2005; Reagon, 2005; Rehman, 2000</td>
</tr>
<tr>
<td>3.3 Select the appropriate resource to match the use’s need</td>
<td>Western Council of State Libraries, 2006</td>
</tr>
<tr>
<td>3.4 Resource sharing/cooperation with other libraries</td>
<td>Mahmood, 2002; Medical Library Association, 2007; Reagon, 2005; Rehman, 2000; Roper &amp; Mayfield, 1993b; Santra, 2007</td>
</tr>
<tr>
<td>3.5 Information needs/Information Seeking behaviour</td>
<td>Khoo, 2005; Medical Library Association, 2007; Reagon, 2005; Rehman, 2000; Roper &amp; Mayfield, 1993b; Special Library Association, 2003; Western Council of State Libraries, 2006</td>
</tr>
<tr>
<td>3.6 Developing specialized information services like selective dissemination of information (SDI), current awareness/current content services, vertical file, bulletin boards, referral, etc.</td>
<td>Buttlar &amp; Du Mont, 1996; Griffiths &amp; King, 1986; Mahmood, 2002; Rehman, 2000; Special Library Association, 2003</td>
</tr>
<tr>
<td>3.7 Developing user education literature and products (brochures, handbooks, pathfinders, subject guide, videos, slide tape show, etc)</td>
<td>Buttlar &amp; Du Mont, 1996; Mahmood, 2002</td>
</tr>
<tr>
<td>3.8 Information manipulation and repackaging</td>
<td>Mahmood, 2002; Reagon, 2005; Rehman, 2000</td>
</tr>
<tr>
<td>3.9 Providing library services to distance learners</td>
<td>Mahmood, 2002</td>
</tr>
<tr>
<td>3.10 Bibliometrics tools and techniques for measurement and evaluation of research outputs</td>
<td>Roper &amp; Mayfield, 1993b; Special Library Association, 2003;</td>
</tr>
<tr>
<td>3.11 Methods of information delivery and access</td>
<td>Roper &amp; Mayfield, 1993a, 1993b; Special Library Association, 2003</td>
</tr>
<tr>
<td>3.12 To work as information intermediaries/conduct intermediary searches for complex difficult or multifield searches</td>
<td>Special Library Association, 2003</td>
</tr>
<tr>
<td>3.13 Strong information literacy skills</td>
<td>Khoo, 2005; Larsen, 2006; Reagon, 2005;</td>
</tr>
</tbody>
</table>

### 4. Health Sciences Resource Management

<table>
<thead>
<tr>
<th>Competency statement</th>
<th>Sources derived from</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.1 Acquire materials according to academic and research programs of the parent organization and knowledge of acquisition tools/selection aids</td>
<td>Ameen, 2009; Mahmood, 2002</td>
</tr>
<tr>
<td>4.2 Knows “the best” textbooks, journals and electronic resources of medical sciences</td>
<td>Special Library Association, 2003</td>
</tr>
<tr>
<td>Competency statement</td>
<td>Sources derived from</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------</td>
</tr>
<tr>
<td>4.3 Knowledge of weeding and understand why weeding is important</td>
<td>Griffiths &amp; King, 1986; Mahmood, 2002; Reagon, 2005</td>
</tr>
<tr>
<td>4.4 Understanding the processes of printing, publishing and book distribution</td>
<td>Mahmood, 2002; Reagon, 2005; Rehman, 2000</td>
</tr>
<tr>
<td>4.5 Knowledge of copyright, licensing, privacy and intellectual property rights</td>
<td>Medical Library Association, 2007; Roper &amp; Mayfield,</td>
</tr>
<tr>
<td>issues/laws</td>
<td>1993a</td>
</tr>
<tr>
<td>4.6 Resource maintenance, conservation and preservation techniques</td>
<td>Buttlar &amp; Du Mont, 1996; Medical Library Association, 2007; Reagon, 2005; Roper &amp; Mayfield, 1993a</td>
</tr>
<tr>
<td>4.7 Manage serial operation (ordering, claiming, invoicing, renewal, holding reports, binding, union list etc)</td>
<td>Reagon, 2005</td>
</tr>
<tr>
<td>4.8 Knowledge and application of classification schemes</td>
<td>Reagon, 2005; Rehman, 2000</td>
</tr>
<tr>
<td>4.9 Knowledge and application of National Library of Medicine (NLM) classification</td>
<td>Roper &amp; Mayfield, 1993a; Santra, 2007</td>
</tr>
<tr>
<td>scheme</td>
<td></td>
</tr>
<tr>
<td>4.10 Analyzing content of documents to determine class numbers and subject terms</td>
<td>Mahmood, 2002</td>
</tr>
<tr>
<td>(subject heading/key words)</td>
<td></td>
</tr>
<tr>
<td>4.11 Knowledge and application of Medical Subject Headings (MeSH)</td>
<td>Roper &amp; Mayfield, 1993a; Santra, 2007</td>
</tr>
<tr>
<td>4.12 Knowledge and application of cataloguing principles, rules, systems and tools</td>
<td>Griffiths &amp; King, 1986; Mahmood, 2002; Rehman, 2000</td>
</tr>
<tr>
<td>4.14 Data conversion utilities and copy cataloguing</td>
<td>Mahmood, n. d.</td>
</tr>
<tr>
<td>4.15 Develop specialized thesauri and list of indexing terms for databases</td>
<td>Griffiths &amp; King, 1986; Roper &amp; Mayfield, 1993a; Special Library Association, 2003</td>
</tr>
<tr>
<td>4.16 Operate the process of circulation (registration, issue, return, reservation, overdue notices and fine management)</td>
<td>Western Council of State Libraries, 2006</td>
</tr>
<tr>
<td>4.17 Ensure safety of resources</td>
<td>Reagon, 2005</td>
</tr>
<tr>
<td>4.18 Indexing and abstracting of documents</td>
<td>Griffiths &amp; King, 1986; Mahmood, 2002; Reagon, 2005; Rehman, 2000</td>
</tr>
</tbody>
</table>

5. **Information Systems and Technologies**

<table>
<thead>
<tr>
<th>Competency statement</th>
<th>Sources derived from</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.1 Retrieval techniques</td>
<td>Bryant &amp; Poustie, 2001; Griffiths &amp; King, 1986; Khoo, 2005; Medical Library Association, 2007; Reagon, 2005; Rehman, 2000; Roper &amp; Mayfield, 1993a,1993b</td>
</tr>
<tr>
<td>5.2 Knowledge of telecommunication and networking</td>
<td>Roper &amp; Mayfield, 1993a</td>
</tr>
<tr>
<td>5.3 Computer programming</td>
<td>Roper &amp; Mayfield, 1993a, 1993b</td>
</tr>
<tr>
<td>5.4 Knowledge and understanding of Internet (email, discussion groups, search engines, www)</td>
<td>Bryant &amp; Poustie, 2001; Khoo, 2005; Mahmood, n.d.; Medical Library Association, 2007; Reagon, 2005;</td>
</tr>
</tbody>
</table>
### Competency statement

<table>
<thead>
<tr>
<th>Competency statement</th>
<th>Sources derived from</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.5 Library Management Systems/ Integrated Library Automation Systems</td>
<td>Butler &amp; Du Mont, 1996; Mahmood, 2002; Rehman, 2000; Reagon, 2005; Roper &amp; Mayfield, 1993b</td>
</tr>
<tr>
<td>5.6 Managing automated systems (input, file maintenance, back-up, security etc)</td>
<td>Mahmood, 2002; Reagon, 2005</td>
</tr>
<tr>
<td>5.7 Using MS Office (MS Word, MS Excel, MS PowerPoint) and Inpage</td>
<td>Khoo, 2005; Mahmood, 2002</td>
</tr>
<tr>
<td>5.8 Digitization (scanner, software, OCR)/Utilization of digitization technology to create documents for online use.</td>
<td>Mahmood, 2002; Reagon, 2005;</td>
</tr>
<tr>
<td>5.9 Knowledge and application Web 2.0 in libraries (Library 2.0)</td>
<td>Maness, 2006.</td>
</tr>
<tr>
<td>5.10 Ability to use Barcodes and RFID technologies for libraries</td>
<td>Khoo, 2005</td>
</tr>
<tr>
<td>5.11 System administration, hardware maintenance, trouble shooting, networking, system migration etc</td>
<td>Mahmood, n.d.; Reagon, 2005; Roper &amp; Mayfield, 1993a, 1993b</td>
</tr>
<tr>
<td>5.12 Basic knowledge of artificial intelligence and expert system</td>
<td>Roper, Mayfield, 1993a</td>
</tr>
<tr>
<td>5.13 Web-page portal designing and management skills</td>
<td>Reagon, 2005; Special Library Association, 2003,</td>
</tr>
<tr>
<td>5.14 Organize and maintain computer assisted instruction (CAI) services</td>
<td>Butlar &amp; Mont, 1996; Mahmood, n. d.; Medical Library Association, 2007</td>
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### Instruction and Teaching

<table>
<thead>
<tr>
<th>Competency statement</th>
<th>Sources derived from</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.1 Make oral presentation to user groups, visitors etc</td>
<td>Buttlar &amp; Du Mont, 1996</td>
</tr>
<tr>
<td>6.2 Ability to run user education programs, deliver library orientation lecture and teach information literacy courses</td>
<td>Griffiths &amp; King, 1986; Khoo, 2005; Medical Library Association, 2007; Reagon, 2005; Rehman, 2000; Western Council of State Libraries, 2006;</td>
</tr>
<tr>
<td>6.3 Select appropriate delivery methods</td>
<td>Reagon, 2005</td>
</tr>
<tr>
<td>6.4 Continuously evaluate learning and revise programs as appropriate</td>
<td>Reagon, 2005</td>
</tr>
<tr>
<td>6.5 Understand curriculum design and development</td>
<td>Guise, et al, 1997; Medical Library Association, 2007</td>
</tr>
<tr>
<td>6.6 Educational needs assessment and analysis/Identifies learners needs</td>
<td>Guise, et al, 1997; Harris, Katherine, Parish &amp; Smith, 2007; Medical Library Association, 2007</td>
</tr>
<tr>
<td>6.7 Learning theory and cognitive psychology</td>
<td>Homan, Foundation &amp; McGowen, 2002</td>
</tr>
<tr>
<td>6.8 Keep up to date with latest training and instructional techniques</td>
<td>Special Library Association, 2003</td>
</tr>
<tr>
<td>6.9 Knowledge of instructional methodologies and teaching techniques</td>
<td>Medical Library Association, 2007; Roper &amp; Mayfield, 1993a</td>
</tr>
<tr>
<td>6.10 Evaluation/assessment of learning outcomes</td>
<td>Roper &amp; Mayfield, 1993a</td>
</tr>
<tr>
<td>6.11 Enhances presentation with effective audiovisual aids and handouts</td>
<td>Bank, Cogdill, Selden &amp; Cahn, 2005; Bryant &amp; Poustie, 2001; Harris, Katherine, Parish &amp; Smith, 2007; Reagon, 2005</td>
</tr>
<tr>
<td>6.12 Develop and conduct in service courses for library staff especially regarding new trends.</td>
<td>Larsen, 2006; Mahmood, 2002; Special Library Association, 2003</td>
</tr>
</tbody>
</table>
### Competency statement | Sources derived from
--- | ---
6.13 Provide bibliographic instruction | Buttlar & Du Mont, 1996
6.14 Participate in health literacy programs | Lindberg & Humphreys, 2005

### 7. Research Methods

<table>
<thead>
<tr>
<th>Competency statement</th>
<th>Sources derived from</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.1 Prepares research proposals</td>
<td>Harris, Katherine, Parish &amp; Smith, 2007</td>
</tr>
<tr>
<td>7.2 Basic understanding of research methodologies (both quantitative and qualitative)</td>
<td>Harrison &amp; Sargeant, 2004; Medical Library Association, 2007; Reagon, 2005; Roper &amp; Mayfield, 1993a</td>
</tr>
<tr>
<td>7.3 Knowledge and application of descriptive and inferential statistics</td>
<td>Roper &amp; Mayfield, 1993a</td>
</tr>
<tr>
<td>7.4 Conduct regular user’s needs assessments using research tools such as questionnaires, focus group, and interviews</td>
<td>Reagon, 2005</td>
</tr>
<tr>
<td>7.5 Conduct research and publish findings in the professional literature</td>
<td>Larsen, 2006; Medical Library Association, 2007</td>
</tr>
<tr>
<td>7.6 Scholarly Communication/ writing scientific report</td>
<td>Reagon, 2005; Roper &amp; Mayfield, 1993a</td>
</tr>
<tr>
<td>7.7 Analysis, evaluation, and application of research results</td>
<td>Griffiths &amp; King, 1986; Roper &amp; Mayfield, 1993a</td>
</tr>
<tr>
<td>7.8 Expertise in evidence-based medicine (identify and retrieve current relevant scientific evidence)</td>
<td>Bryant &amp; Poustie, 2001; Medical Library Association, 2007</td>
</tr>
<tr>
<td>7.9 Data analysis (Research) software (SPSS, Instat etc)</td>
<td>Mahmood, n. d.</td>
</tr>
<tr>
<td>7.10 Citation software/reference managers (endnote, Procite, etc)</td>
<td>Mahmood, n. d.</td>
</tr>
</tbody>
</table>

### 8. General and Personal Competencies

<table>
<thead>
<tr>
<th>Competency statement</th>
<th>Sources derived from</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.1 Capacity and desire to work independently</td>
<td>Bryant &amp; Poustie, 2001; Griffiths &amp; King, 1986</td>
</tr>
<tr>
<td>8.2 Ability to work under pressure</td>
<td>Khoo, 2005</td>
</tr>
<tr>
<td>8.3 Demonstrating a knowledge and commitment to the ethics and value of profession</td>
<td>Mahmood, 2002</td>
</tr>
<tr>
<td>8.4 Participating in professional activities outside the library</td>
<td>Khoo, 2005; Mahmood, 2002; Western Council of State Libraries, 2006</td>
</tr>
<tr>
<td>8.5 Developing desk-top publishing capacity</td>
<td>Khoo, 2005; Mahmood, 2002;</td>
</tr>
<tr>
<td>8.6 Understanding historical background of library and information services in the world.</td>
<td>Mahmood, 2002; Reagon, 2005</td>
</tr>
<tr>
<td>8.7 Editing library publications</td>
<td>Mahmood, 2002</td>
</tr>
<tr>
<td>8.9 Create an environment of mutual respect and trust</td>
<td>Special Library Association, 2003</td>
</tr>
<tr>
<td>8.10 Is committed to lifelong learning and personal career planning</td>
<td>Roper &amp; Mayfield, 1993a; Special Library Association, 2003</td>
</tr>
<tr>
<td>Competency statement</td>
<td>Sources derived from</td>
</tr>
<tr>
<td>----------------------</td>
<td>----------------------</td>
</tr>
<tr>
<td>8.11 Adaptability to change</td>
<td>Bryant &amp; Poustie, 2001; Khoo, 2005; Larsen, 2006; Reagon, 2005; Roper &amp; Mayfield, 1993a; Special Library Association, 2003</td>
</tr>
<tr>
<td>8.12 Intelligence, common sense, creativity, decisiveness, and patience</td>
<td>Bryant &amp; Poustie, 2001; Griffiths &amp; King, 1986; Khoo, 2005; Larsen, 2006; Reagon, 2005; Roper &amp; Mayfield, 1993a</td>
</tr>
<tr>
<td>8.13 Initiative, innovativeness, multitasking and vision</td>
<td>Griffiths &amp; King, 1986; Khoo, 2005; Larsen, 2006; Roper &amp; Mayfield, 1993a</td>
</tr>
<tr>
<td>8.14 Self-supervision</td>
<td>Reagon, 2005</td>
</tr>
<tr>
<td>8.15 Sense of humour</td>
<td>Griffiths &amp; King, 1986; Khoo, 2005; Larsen, 2006</td>
</tr>
<tr>
<td>8.16 Capacity to take risks</td>
<td>Western Council of State Libraries, 2006</td>
</tr>
<tr>
<td>8.17 Willingness to ask questions</td>
<td>Harrison &amp; Sargeant, 2004; Reagon, 2005; Roper &amp; Mayfield, 1993a</td>
</tr>
<tr>
<td>8.18 Ability to learn new skill</td>
<td>Bryant &amp; Poustie, 2001; Griffiths &amp; King, 1986; Harrison &amp; Sargeant, 2004; Khoo, 2005; Larsen, 2006; Reagon, 2005</td>
</tr>
<tr>
<td>8.19 Committed to service excellence/ Service orientation</td>
<td>Khoo, 2005; Larsen, 2006; Roper &amp; Mayfield, 1993a; Special Library Association, 2003</td>
</tr>
<tr>
<td>8.20 Sees the big picture</td>
<td>Special Library Association, 2003</td>
</tr>
</tbody>
</table>

Appendix B

List of Sources Used for Raw Competency Statements

(Times each source used)


### Appendix C

**Composite List of Validated Competency Statements**

<table>
<thead>
<tr>
<th>S. No</th>
<th>Competency Statement</th>
<th>Head Librarians</th>
<th>Library Coordinators</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(The numbers in brackets are related to the Subject Domain)</td>
<td>Mean (SD)</td>
<td>Rank</td>
</tr>
<tr>
<td>1</td>
<td>Knowledge and understanding of Internet for library use (e-mail, discussion groups, search engines, web resources, methods of information delivery) (5.6)</td>
<td>4.58 (.700)</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Eager to learn new skills (8.10)</td>
<td>4.57 (.701)</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>Knowledge of bibliographic tools, selection aids, and acquisition of materials (4.1)</td>
<td>4.55 (.610)</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>Communicating effectively in oral, written and electronic form (2.19)</td>
<td>4.54 (.682)</td>
<td>4-5</td>
</tr>
<tr>
<td>5</td>
<td>Using MS Office (MS Word, MS Excel, MS Powerpoint) and Inpage (5.8)</td>
<td>4.54 (.682)</td>
<td>4-5</td>
</tr>
<tr>
<td>6</td>
<td>Commitment to service excellence (8.1)</td>
<td>4.54 (.703)</td>
<td>6</td>
</tr>
<tr>
<td>7</td>
<td>Knowledge of print and electronic reference resources in health sciences (3.3)</td>
<td>4.52 (.560)</td>
<td>7</td>
</tr>
<tr>
<td>8</td>
<td>Ability to make decisions (2.3)</td>
<td>4.49 (.637)</td>
<td>8</td>
</tr>
<tr>
<td>9</td>
<td>Expertise in information retrieval and search strategy techniques (3.5)</td>
<td>4.43 (.722)</td>
<td>9</td>
</tr>
<tr>
<td>10</td>
<td>Knowledge and application of cataloguing rules, standards for bibliographic formats, data conversion and copy cataloguing (4.4)</td>
<td>4.39 (.673)</td>
<td>10</td>
</tr>
<tr>
<td>11</td>
<td>Resource sharing and coordination with other libraries in online environment (3.8)</td>
<td>4.39 (.717)</td>
<td>11</td>
</tr>
<tr>
<td>12</td>
<td>Capability to work independently and under pressure (8.2)</td>
<td>4.39 (.816)</td>
<td>12</td>
</tr>
<tr>
<td>13</td>
<td>Knowledge of Integrated Library Automation Systems (5.1)</td>
<td>4.37 (.648)</td>
<td>13</td>
</tr>
<tr>
<td>14</td>
<td>Commitment to lifelong learning and career planning (8.11)</td>
<td>4.36 (.732)</td>
<td>14</td>
</tr>
<tr>
<td>15</td>
<td>Knowledge of formulating policies and procedures relating to library services (2.6)</td>
<td>4.34 (.708)</td>
<td>15</td>
</tr>
<tr>
<td>16</td>
<td>Capability of analytical skills and problem solving (2.4)</td>
<td>4.31 (.763)</td>
<td>16</td>
</tr>
<tr>
<td>17</td>
<td>Personnel management and staff development (recruit, train, supervise, and evaluate staff) (2.17)</td>
<td>4.28 (.692)</td>
<td>17</td>
</tr>
<tr>
<td>18</td>
<td>Ability to use medical bibliographic databases (3.4)</td>
<td>4.28 (.714)</td>
<td>18</td>
</tr>
<tr>
<td>S. No</td>
<td>Competency Statement</td>
<td>Head Librarians</td>
<td>Library Coordinators</td>
</tr>
<tr>
<td>-------</td>
<td>--------------------------------------------------------------------------------------</td>
<td>-----------------</td>
<td>----------------------</td>
</tr>
<tr>
<td></td>
<td>(The numbers in brackets are related to the Subject Domain)</td>
<td>Mean (SD)</td>
<td>Mean (SD)</td>
</tr>
<tr>
<td>19</td>
<td>Ability to develop specialized information services such as selective dissemination of information (SDI), current awareness/current content services, bulletin boards, referral services, etc (3.7)</td>
<td>4.27 (.665)</td>
<td>3.78 (.870)</td>
</tr>
<tr>
<td>20</td>
<td>Capability of time management and setting priorities (2.5)</td>
<td>4.27 (.863)</td>
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<tr>
<td>21</td>
<td>Knowledge and commitment to professional ethics and values (8.5)</td>
<td>4.27 (.898)</td>
<td>4.27 (.700)</td>
</tr>
<tr>
<td>22</td>
<td>Knowledge of serial management and operation (ordering, claiming, invoicing, renewal, holding reports, binding, etc) (4.6)</td>
<td>4.25 (.704)</td>
<td>3.62 (.958)</td>
</tr>
<tr>
<td>23</td>
<td>Planning and goal setting skills (2.2)</td>
<td>4.25 (.785)</td>
<td>3.94 (.821)</td>
</tr>
<tr>
<td>24</td>
<td>Interpersonal and public relations skills (2.9)</td>
<td>4.22 (.775)</td>
<td>3.68 (.839)</td>
</tr>
<tr>
<td>25</td>
<td>Ability to develop and conduct training courses for library staff especially pertaining to new trends (2.18)</td>
<td>4.21 (.708)</td>
<td>4.08 (.829)</td>
</tr>
<tr>
<td>26</td>
<td>Understanding of the institution’s information policies (1.8)</td>
<td>4.21 (.845)</td>
<td>3.79 (1.109)</td>
</tr>
<tr>
<td>27</td>
<td>Ability to evaluate library performance qualitatively and quantitatively (2.16)</td>
<td>4.19 (.701)</td>
<td>4.02 (1.039)</td>
</tr>
<tr>
<td>28</td>
<td>Create an environment of mutual respect and trust (8.6)</td>
<td>4.19 (.839)</td>
<td>4.44 (.778)</td>
</tr>
<tr>
<td>29</td>
<td>Ability to operate the process of circulation (registration, issue, return, reservation, overdue notices and fine management) (4.9)</td>
<td>4.19 (.875)</td>
<td>3.70 (1.102)</td>
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<td>30</td>
<td>Self-supervision (8.8)</td>
<td>4.15 (.803)</td>
<td>4.00 (.803)</td>
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<tr>
<td>31</td>
<td>Knowledge of different branches and specialties of health sciences (1.1)</td>
<td>4.13 (.716)</td>
<td>3.70 (.796)</td>
</tr>
<tr>
<td>32</td>
<td>Capacity to take initiatives and risks (8.3)</td>
<td>4.12 (.826)</td>
<td>3.95 (.792)</td>
</tr>
<tr>
<td>33</td>
<td>Ability to make presentations to user groups, visitors, etc (6.6)</td>
<td>4.12 (.844)</td>
<td>3.73 (.700)</td>
</tr>
<tr>
<td>34</td>
<td>Knowledge of accreditation standards that affect medical libraries (1.7)</td>
<td>4.10 (.741)</td>
<td>3.90 (1.043)</td>
</tr>
<tr>
<td>35</td>
<td>Understanding of information seeking behaviour and needs of users (3.1)</td>
<td>4.10 (.800)</td>
<td>4.14 (.820)</td>
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<tr>
<td>36</td>
<td>Ability to manage automated systems (input, file maintenance, back-up, security, etc) (5.2)</td>
<td>4.09 (.773)</td>
<td>3.75 (.897)</td>
</tr>
<tr>
<td>37</td>
<td>Ability to conduct reference interviews and select the appropriate resource to match the users’ needs (3.2)</td>
<td>4.07 (.681)</td>
<td>3.94 (.716)</td>
</tr>
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<td></td>
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</tr>
<tr>
<td>38</td>
<td>Ability to prepare and manage budget and raise funds from external sources (2.7)</td>
<td>4.07</td>
<td>38</td>
</tr>
<tr>
<td>39</td>
<td>Understanding of medical terminology and concepts (1.4)</td>
<td>4.07</td>
<td>39</td>
</tr>
<tr>
<td>40</td>
<td>Ability to conduct meetings effectively (2.11)</td>
<td>4.04</td>
<td>40</td>
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<tr>
<td>41</td>
<td>Expertise in evidence-based medical information searching (identifying and retrieving latest medical evidence) (3.6)</td>
<td>4.04</td>
<td>41-42</td>
</tr>
<tr>
<td>42</td>
<td>Understanding of digitization technology and management programmes to create digital resources (5.5)</td>
<td>4.04</td>
<td>41-42</td>
</tr>
<tr>
<td>43</td>
<td>Participation in professional activities outside the library (8.9)</td>
<td>4.00</td>
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<tr>
<td>44</td>
<td>Adaptability to change (8.4)</td>
<td>4.00</td>
<td>44</td>
</tr>
<tr>
<td>45</td>
<td>Capability of indexing and abstracting of documents (4.5)</td>
<td>3.97</td>
<td>45</td>
</tr>
<tr>
<td>46</td>
<td>Knowledge of resource maintenance, safety, conservation and preservation techniques (4.7)</td>
<td>3.97</td>
<td>46</td>
</tr>
<tr>
<td>47</td>
<td>Basic knowledge of building, space and facility planning (to identify ways to use resources more efficiently and create healthy work spaces that increase productivity) (2.15)</td>
<td>3.96</td>
<td>47</td>
</tr>
<tr>
<td>48</td>
<td>Preparation of reports for concerned authorities (2.12)</td>
<td>3.96</td>
<td>48</td>
</tr>
<tr>
<td>49</td>
<td>Change management, i.e., having the ability to integrate library resources and services in response to environmental change (2.8)</td>
<td>3.93</td>
<td>49</td>
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<tr>
<td>50</td>
<td>Ability to enhance presentation with effective a-v aids and handouts (6.7)</td>
<td>3.90</td>
<td>50</td>
</tr>
<tr>
<td>51</td>
<td>Knowledge of information literacy standards (6.1)</td>
<td>3.88</td>
<td>51</td>
</tr>
<tr>
<td>52</td>
<td>Ability to conduct environment scanning (a process of gathering, analyzing, and dispensing information for tactical or strategic purposes) (2.1)</td>
<td>3.88</td>
<td>52</td>
</tr>
<tr>
<td>53</td>
<td>Ability to use Barcodes and RFID (Radio Frequency Identification) technologies for libraries (5.3)</td>
<td>3.87</td>
<td>53</td>
</tr>
<tr>
<td>54</td>
<td>Knowledge and application of Web 2.0 technology in libraries (Library 2.0) (5.4)</td>
<td>3.85</td>
<td>54</td>
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<tr>
<td>55</td>
<td>Knowledge and application of the National Library of Medicine system of Medical Subject Headings (MeSH) (4.3)</td>
<td>3.84</td>
<td>55</td>
</tr>
<tr>
<td>56</td>
<td>Basic understanding of research methodologies (both quantitative and qualitative) (7.1)</td>
<td>3.81</td>
<td>56</td>
</tr>
<tr>
<td>57</td>
<td>Negotiating skills for contracts/agreements (2.10)</td>
<td>3.81</td>
<td>57-58</td>
</tr>
<tr>
<td></td>
<td>Knowledge and practice</td>
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<tr>
<td>58</td>
<td>Knowledge of weeding practice (discarding and writing off unusable and obsolete materials) and its importance (4.83)</td>
<td>3.81</td>
<td>57-58</td>
</tr>
<tr>
<td>59</td>
<td>Marketing of library services and resources (2.14)</td>
<td>3.81</td>
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</tr>
<tr>
<td>60</td>
<td>Knowledge of information literacy needs assessment (6.2)</td>
<td>3.79</td>
<td>60</td>
</tr>
<tr>
<td>61</td>
<td>Organizing activities such as displays, exhibitions, talks, etc. (2.13)</td>
<td>3.76</td>
<td>61</td>
</tr>
<tr>
<td>62</td>
<td>Basic knowledge of database management (5.11)</td>
<td>3.73</td>
<td>62</td>
</tr>
<tr>
<td>63</td>
<td>Knowledge and application of National Library of Medicine (NLM) classification scheme (4.2)</td>
<td>3.70</td>
<td>63</td>
</tr>
<tr>
<td>64</td>
<td>Knowledge of education and training patterns of health related professions (1.2)</td>
<td>3.69</td>
<td>64</td>
</tr>
<tr>
<td>65</td>
<td>Knowledge and application of citation styles and reference managers (endnote, Procite, etc) (7.5)</td>
<td>3.69</td>
<td>65</td>
</tr>
<tr>
<td>66</td>
<td>Ability to select appropriate delivery methods for information literacy programmes (6.5)</td>
<td>3.67</td>
<td>66</td>
</tr>
<tr>
<td>67</td>
<td>Knowledge of copyright, licensing, privacy and intellectual property rights issues/laws (4.10)</td>
<td>3.64</td>
<td>67</td>
</tr>
<tr>
<td>68</td>
<td>Ability to develop and deliver information literacy programmes and products (such as lectures, tutorials, brochures, pathfinders, subject guides, etc) (6.4)</td>
<td>3.64</td>
<td>68</td>
</tr>
<tr>
<td>69</td>
<td>Ability to use research tools such as questionnaires, focus groups and interviews to conduct user’s studies (7.3)</td>
<td>3.64</td>
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<tr>
<td>70</td>
<td>Ability to write research reports (7.7)</td>
<td>3.60</td>
<td>70</td>
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<tr>
<td>71</td>
<td>Knowledge of health sciences scholarly communication patterns and information infrastructure (1.9)</td>
<td>3.55</td>
<td>71</td>
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<tr>
<td>72</td>
<td>Information manipulation and repackaging (finding, evaluating, selecting, and rewriting information for immediate use by the client) (3.9)</td>
<td>3.55</td>
<td>72</td>
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<tr>
<td>73</td>
<td>Knowledge of objectives of medical education at undergraduate as well as postgraduate level (1.3)</td>
<td>3.51</td>
<td>73</td>
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<tr>
<td>74</td>
<td>Web-page/portal designing and maintenance skills (5.10)</td>
<td>3.48</td>
<td>74</td>
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<tr>
<td>75</td>
<td>Basic knowledge of and ability to use expert systems (software which find information like a human expert in the field to solve problems) (5.9)</td>
<td>3.46</td>
<td>75</td>
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<tr>
<td>76</td>
<td>Analysis, evaluation, and application of research results (7.6)</td>
<td>3.42</td>
<td>76</td>
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<tr>
<td></td>
<td>Knowledge and application of biomedical informatics (3.10)</td>
<td>3.36</td>
<td>77</td>
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<tr>
<td>78</td>
<td>Knowledge of instructional methodologies and teaching techniques (6.3)</td>
<td>3.34</td>
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<tr>
<td></td>
<td>(0.863)</td>
<td>(0.837)</td>
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<tr>
<td>79</td>
<td>Familiarity with various health and health related associations and organizations (1.5)</td>
<td>3.28</td>
<td>79</td>
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<tr>
<td></td>
<td>(0.794)</td>
<td></td>
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<tr>
<td>80</td>
<td>Knowledge and application of data analysis software (SPSS, Instate etc) (7.4)</td>
<td>3.25</td>
<td>80</td>
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<tr>
<td></td>
<td>(0.841)</td>
<td>(0.893)</td>
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<tr>
<td>81</td>
<td>Some knowledge of telecommunication and networking (5.7)</td>
<td>3.25</td>
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<tr>
<td></td>
<td>(0.910)</td>
<td>(1.150)</td>
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<tr>
<td>82</td>
<td>Basic knowledge of descriptive and inferential statistics (7.2)</td>
<td>3.16</td>
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<td></td>
<td>(0.881)</td>
<td>(0.978)</td>
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</tr>
<tr>
<td>83</td>
<td>Sense of humor (8.7)</td>
<td>3.06</td>
<td>83</td>
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<tr>
<td></td>
<td>(0.936)</td>
<td></td>
<td></td>
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<tr>
<td>84</td>
<td>Knowledge of health care ethics and medico-legal issues (1.6)</td>
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</tbody>
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