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Abhirame Sivasanthiran, MLS

University of Colombo, Colombo, Sri Lanka, sabhikal@gmail.com

G D Manoja Nilanthi Samaradiwakara, PhD

University of Sri Jayewardenepura, Nugegoda, Sri Lanka, mnsamara@sjp.ac.lk

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TITLE PAGE

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Abhirame Sivasanthiran, MLS

(Corresponding author)

University of Colombo, Colombo, Sri Lanka

Email: sabhikal@gmail.com

G D Manoja Nilanthi Samaradiwakara, PhD

University of Sri Jayewardenepura, Nugegoda, Sri Lanka

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Information needs of mathematicians in Sri Lankan universities

Abstract

This study attempts to fill an essential knowledge gap on the information needs of the mathematicians in Sri Lankan universities. As the indispensability of the teaching and research of the university mathematicians towards all the other disciplines and various sectors of the country is widely understood, it is essential for the university libraries to methodically learn the characteristics of their information requirements for their academic endeavours. However, the unavailability of any such research output on the mathematicians of Sri Lanka led to this study with the objectives of examining the purposes of information, frequency of information seeking and the factors influencing the information needs of the mathematicians. This quantitative research made use of questionnaires to collect data from 145 mathematicians, and found out that the mathematicians primarily perform tasks of three work roles namely educator, researcher and student, all of which trigger information needs. They seek information almost daily for their teaching and research work, besides for regularly keeping them up-to-date. Their information needs are highly influenced by demographic factors such as age and experience, beside their academic tasks. These results would be useful in selectively disseminating information for mathematicians, and in further exploration towards information sources and seeking behaviour.

Keywords: Information needs, mathematicians, statisticians, universities, Sri Lanka.

1. Introduction

The libraries, especially those serving the universities, should cater the users with the right information, when they have the thirst for information for various needs. Therefore, it becomes essential for those libraries to have good understanding of the information needs of the users of all categories, via a systematic study to make use of that knowledge to enhance the library services to suit the requirements of each user group. Also, the importance of the libraries' effectively serving the academics of any university cannot be taken lightly, because, as stated by Abouserie (2007), the academics are the heart of the university, who carry out the key tasks of teaching, learning and research. However, the university libraries in Sri Lanka experience a drastic reduction in the usage of physical library by science-based academics. Therefore, the librarians serving the Sri Lankan universities are left with the responsibility of primarily studying the various components of the information needs of the above academics, in order to

appropriately serve them. Those components are the purpose of information, frequency of information needs and the influencing factors.

From the review of literature, it could be found that the information needs vary from one discipline to another, and hence the current study should individually be focused on each discipline. Unlike other disciplines, the field of Mathematics takes the responsibility of finding solutions for problems in the other fields as well. Therefore, the mathematicians of the universities largely contribute to various sectors of the nation. This illustrates the uniqueness and the caliber of the research work of the Departments of Mathematics and Statistics, and their magnitude towards the development of the nation. However, no past studies that attempts to identify the information needs of mathematicians or statisticians in Sri Lanka were encountered during the literature review, and hence, this study heads to fill this knowledge gap.

2. Review of literature

Firstly, the famous information seeking model of Leckie (1996) for professionals including academics enlightens that the characteristics of information needs are decided by the work roles and tasks performed, and shaped by demographic factors, such as designation, years of experience, field of specialization, geographic location, etc. The study of Sapa, Krakowska & Janiak (2014) on the mathematicians in Poland, which adapted Leckie model, shows that work roles, demographic aspects and frequency of information needs have to be examined to understand the information needs. Another research by Preez (2008), which also adapted the Leckie model, additionally claims that different stages of the tasks and their complexities also have to be studied.

Secondly, there are many other local and foreign studies that identify several aspects of information needs of academics on various disciplines, while endorsing the claims of above researchers. Vakkari (2003) says that the study on information needs would be partial, if the need-triggering tasks are not linked to aspects of searching. When speaking about the information needs of researchers, Manikandan (2013) emphasizes that such needs are influenced by their field of study. He shows the difference in the quickness of information needed: due to the rapidity in production of information in Pure Science, an information need of a pure scientist may be more urgent than that of a social scientist.

Ileperuma (2002) found that the Arts scholars in Sri Lanka need information mainly for keeping up with the current developments and for supporting research work. However, Tahir, Mahmood

& Shafique (2008) identify that the main purpose of information seeking of the Arts and Humanities scholars in the University of Punjab, Pakistan is to guide their researchers and students, besides for preparing lectures. On the other hand, Karunarathne (2008) claims out of his research on the management academics in Sri Lanka, that majority of those faculties seek information for the purpose of their further education, compared to teaching and research.

Abouserie (2007), in Illinois, found out that Library and Information faculty need information mainly for conducting research and for writing research results for publication. According to Ngozi, Uche & Ejiro (2015), information needs of the faculty in Nigerian universities is primarily for academic and research works on top of self-development, current affairs and personal health knowledge. But, a study by Haruna & Mabawonku (2001) reveals that knowing the latest decisions of superior courts is the major professional information need of many academic lawyers in Nigeria.

According to a study conducted on the environmental scientists of the Sri Lankan universities, Gamage (2006) says that these scientists seek information mainly to keep up with the current developments in the field, and to develop competencies in their specialized subfields, rather than their teaching activity. In contrast, Thirugnanasundaram (1994) determines that the key purpose of the chemists of Sri Lanka to search for information is to support their research work, and then to prepare educational materials for teaching.

Jamali & Nicholas (2008) find out that the most important need of the physicists and astronomers of the University College London is to keep themselves up-to-date, and the level of information requirements varies with their academic hierarchy. Similarly, Brindesi & Kapidakis (2011) in their research on astronomers of the University of Athens, Greece, identify that the main interest of the professors and researchers is being in touch with the current developments in their field, and also reveal that there are differences in the level of information requirement among the astronomers, based on their subfield. From the ongoing discussion, it becomes apparent that information needs vary by disciplines and subfields, tasks performed, academic hierarchy and the nationality. However, there exists no research output on the information needs of the mathematicians of the Sri Lankan universities, and hence the present research is undertaken.

3. Objectives of the study

- To identify the purposes of information for the mathematicians in the Sri Lankan universities.

- To find out the frequency of information seeking by these mathematicians.
- To examine the factors influencing the information needs of these mathematicians.

4. Research design and methods

As defined by Kumar (1999), current study is an explanatory type quantitative research that shows the characteristics of deductive approach and used self-administered questionnaires to collect data from 145 mathematicians and statisticians of 11 state universities. Out of 15 state universities in Sri Lanka, only 11 exclusively have Departments of Mathematics and Statistics. Table 1 presents the staff strengths of each university, under the categories: Professors (Prof.), Senior Lecturers (Sen. Lr.), Lecturers (Lr.), and Probationary Lecturers (PLr.). Since this population is comparatively small in size, it was decided to include all the members of the study population in the survey, without selecting a sample.

Table 1: Study Population

	University	Prof.	Sen. Lr.	Lr.	PLr.	Total
1.	University of Colombo (UoC)	2	26	2	2	32
2.	University of Peradeniya (UoP)	5	11	6	9	31
3.	University of Sri Jayewardenepura (USJP)	2	15	3	4	24
4.	University of Kelaniya (UoK)	0	16	2	8	26
5.	University of Moratuwa (UoM)	1	6	4	0	11
6.	University of Jaffna (UoJ)	2	8	1	10	21
7.	University of Ruhuna (UoR)	1	5	0	1	07
8.	The Open University of Sri Lanka (OUSL)	0	4	2	2	08
9.	Eastern University, Sri Lanka (EUSL)	2	6	0	3	11
10.	South Eastern University of Sri Lanka (SEUSL)	0	5	0	2	07
11.	Wayamba University of Sri Lanka (WUSL)	0	6	1	3	10
	Total	15	108	21	44	188

(Source: The official websites of the respective universities or the offices of the relevant departments)

The data was analysed using the software package SPSS (Statistical Package for the Social Sciences), where descriptive statistics were used for interpretations and Chi-square test was used to find the influences of personal and professional factors on the information needs.

5. Results

This study saw a response rate of 77.13%, with 145 out of 188 completed questionnaires received.

5.1 Demographic information

The data shows that majority (50.34%) of the respondents were females, and most of the respondents fall in the youngest age group of 23 to 35 years (43.75%), with the oldest group (56 - 65 years) having only 7.64% of the respondents. The analysis also reveals that the doctoral degree is held by most of the respondents (42.76%), with the numbers gradually dropping to Bachelors Degree holders (25.52%). Further, it becomes evident that most of the respondents have 6 to 10 years (25.52%) of experience followed by 20.69% having 1 to 5 years of experience, 13.79% having 11 to 15 years and so on, whereas only 0.69% of them have experience more than 40 years.

5.2 Purposes of information

The six most prioritized purposes of information were considered in this study. The mean values of those responses on 3-point Likert scale of importance is shown in Table 2.

Table 2: Purposes of information seeking (N=145)

Purposes	Mean	Standard Deviation	Respondents Above Mean	Percentage
Teaching	2.75	0.449	110	75.9%
Research work	2.76	0.461	112	77.2%
Own PG studies	2.08	0.838	57	39.3%
To be up-to-date	2.53	0.578	83	57.2%
Scholarly communications	2.40	0.628	69	47.6%
Supervising projects	2.32	0.653	61	42.1%

As shown in Table 2, the majority has opted research (77.2%) to be the highly important purpose, for which they seek information, while teaching (75.9%) is the next important purpose, followed by keeping up-to-date (57.2%). In the meantime, most of them feel that own Post Graduate (PG) studies (39.3%) is a less important purpose that needs information seeking. Further, it was revealed via a Chi-square test that the purpose 'Own PG studies' is highly influenced (alpha-value = 0.002) by positions and the importance drops with seniority as: Probationary Lecturers - 55.0%, Lecturers - 53.85%, Senior Lecturers - 31.17%, and Professors

- 11.11%. This is due to the reason that mostly the junior academics only engage themselves in higher studies.

5.3 Frequency of information seeking

The frequencies, in which the respondents search information for the purposes dealt with in above section, are presented in Table 3.

Table 3: Frequency of information seeking on 3-point Likert scale with 3= Daily, 2=Monthly, 3= Quarterly or more (N=145)

Frequencies of:	Mean	Standard Deviation	Respondents Above Mean	Percentage
Teaching	2.81	0.471	123	84.8%
Research work	2.73	0.490	109	75.2%
Own PG studies	1.94	0.806	94	64.8%
To be up-to-date	2.59	0.560	90	62.1%
Scholarly communications	2.19	0.690	51	35.2%
Supervising projects	2.21	0.709	55	37.9%

According to Table 3, the majority has opted that teaching (84.8%) requires information most frequently, which is almost daily. Similarly, research work (75.2%) and keeping up-to-date (62.1%) take second and third ranks in the frequency of information needs, respectively. However, the results show that the own PG studies is the purpose that requires information least frequently. Subsequently, a group of Chi-square test performed between frequencies of information needs and academic positions disclosed that there are significant differences (alpha value = 0.000) in the frequencies based on positions, except for 'Teaching', as illustrated by Figure 1.

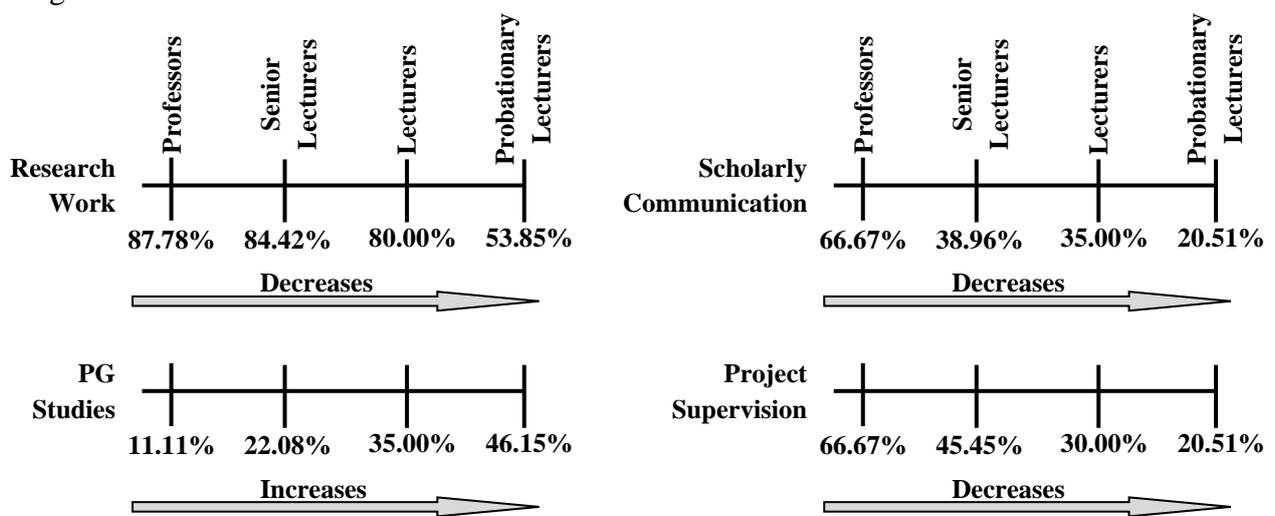


Figure 1: Variation in frequency of information seeking according to academic position

5.4 Factors influencing the information needs

There are two types of factors that were tested to have influence on the information needs of the mathematicians, and those were demographic and professional factors.

5.4.1 Influence of demographic factors

The influences of demographic factors such as affiliated university, educational qualification, gender, age, and years of experience, on the information needs were examined, by creating a new variable called 'Information needs' using the mean values of the various purposes of information dealt with above and by performing a Chi-square test to test the influence of demographic factors on this new variable. The extracted alpha-values of the results of this test are presented in Table 4.

Table 4: Results of Chi-square test of influence of demographic factors on needs

	Alpha value	Conclusion
University	0.741	Exerts no significant influence on information needs
Department	0.883	Exerts no significant influence on information needs
Education	0.203	Exerts no significant influence on information needs
Gender	0.506	Exerts no significant influence on information needs
Age	0.009	Exerts highly significant influence on information needs
Experience	0.003	Exerts highly significant influence on information needs

It is evident that only age and experience have highly significant influence on the information needs of the mathematicians, while affiliated university or department, gender, and the highest educational qualifications exert no significant effect on the information needs.

5.4.2 Influence of professional factors

This study identified that the mathematicians play three major roles in their profession as 'Educator', 'Researcher' and 'Learner'. 99.3% of them play the role of an 'Educator' and 93.1% play the role of a 'Researcher', while 51.7% play the role of a 'Learner'. A correlation analysis suggests that the work role 'Educator' does not depend on the academic positions, whereas the other two roles do. Thus, it was observed that research work drops from Professors to Probationary Lecturers (from 100% to 79.5%). In the meantime, all the academics equally engage in learning in order to keep them up-to-date. Yet, the Probationary Lecturers have the highest percentage of 71.8% for learner role, as most of them read for their higher degrees. Further, each role undertakes several tasks, as the major three are highlighted in Figure 2.

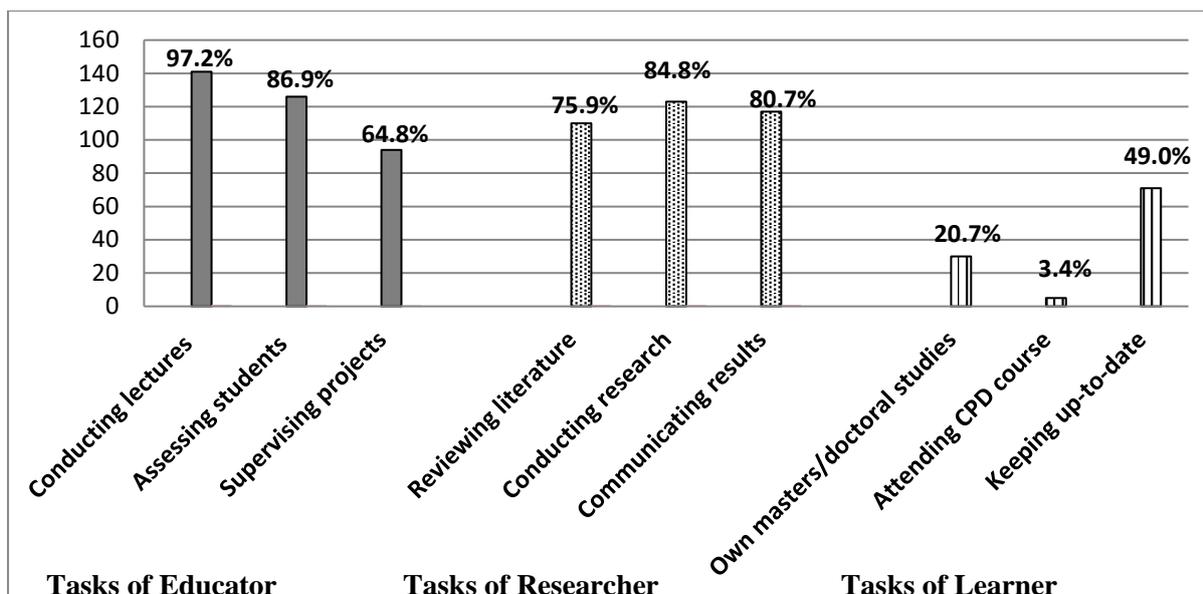


Figure 2: Tasks performed within each role (N=145)

The influences of these work roles and the associated tasks on the information needs of the mathematicians were examined using the Chi-square test. The extracts (alpha values) of the results of this test are presented in Table 5 with all the significant paths from work roles and tasks to the purposes of information highlighted.

Table 5: Alpha values of Chi-square test of influence of work roles and tasks on needs (N=145)

Work roles and Tasks	Purposes of Information					
	Teaching	Research work	Own PG Studies	Keeping up-to-date	Scholarly comm.	Guiding student projects
Educator	0.000	0.862	0.460	0.449	0.538	0.013
Researcher	0.926	0.000	0.092	0.321	0.032	0.030
Learner	0.561	0.222	0.000	0.090	0.281	0.291
Conduct lecture	0.000	0.959	0.373	0.841	0.080	0.564
Assess students	0.009	0.684	0.074	0.303	0.269	0.133
Supervise project	0.167	0.004	0.055	0.133	0.311	0.000
Literature review	0.805	0.000	0.019	0.201	0.301	0.053
Conduct research	0.829	0.000	0.209	0.164	0.015	0.102
Comm. results	0.382	0.000	0.092	0.106	0.000	0.001
Own PG studies	0.124	0.350	0.000	0.297	0.962	0.112
CDP courses	0.964	0.960	0.628	0.563	0.697	0.540
Keeping up-to-date	0.590	0.146	0.001	0.008	0.204	0.150

The results indicate that each work role and tasks trigger different information needs (via the alpha values < 0.05). Those influences are as shown below in Figure 3, which incorporates only the fifteen (15) highly significant relationships (alpha < 0.01).

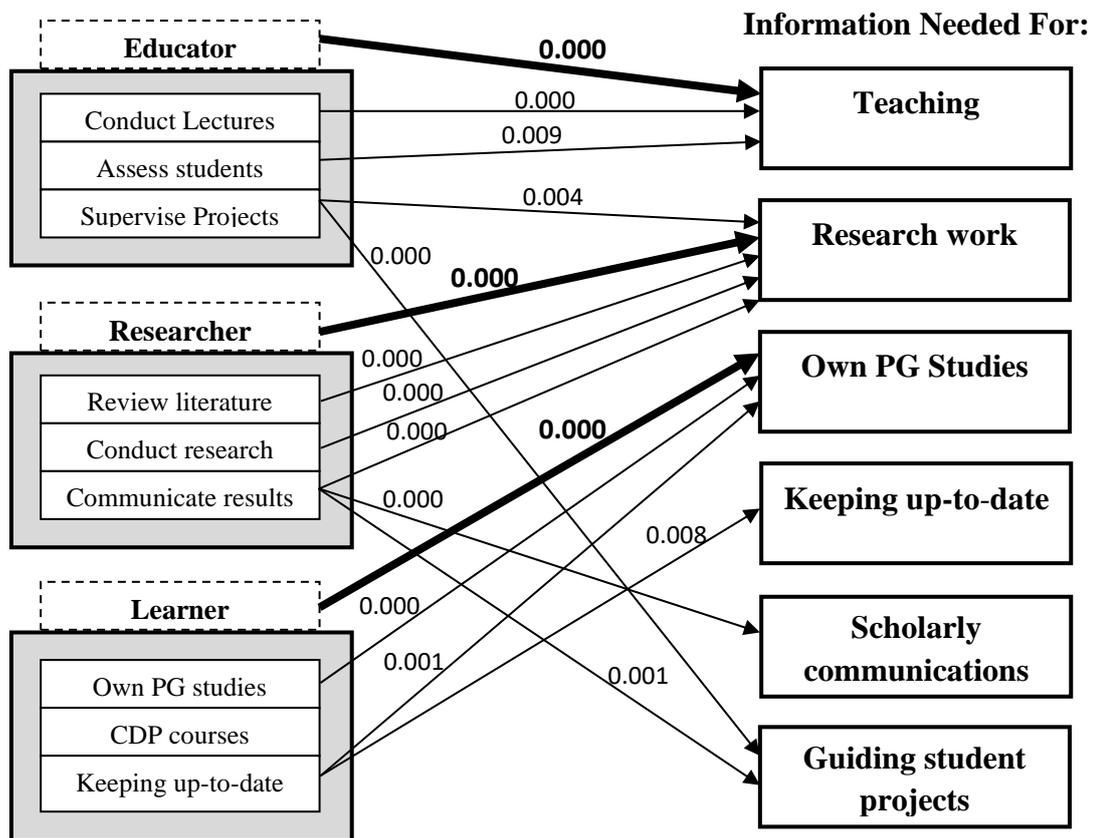


Figure 3: Influence of Work roles and tasks on information needs

Referring to Table 5 and Figure 3, 'conducting lecture' and 'assessing students' influence the need for 'teaching'. The 'supervising projects' triggers the information need in two instances: 'guiding students' projects' and part of 'research work', because supervising the projects partially falls under research work. Then, all three tasks of the role of researcher obviously trigger information need of 'research work'. In the meantime, the third task 'communicating results' gives rise to purposes like 'scholarly communications' and 'guiding student projects'. It can be justified that results of the students' projects also get communicated in scholarly way. Finally, it was found that only two tasks of the 'leaner' role trigger information needs: i.e. 'reading own PG studies' and 'keeping up-to-date' give rise to corresponding information needs. However, 'attending CDP course' is not a significant task that triggers information needs.

6. Discussion and Conclusion

6.1 Purposes of information

It was found that 'research work' and 'teaching' are the most important purposes for the respondents to seek information. This is in contrast to the Sri Lankan university academics of other disciplines: art scholars (Ileperuma, 2002) and environmental scientist (Gamage, 2006) give priority for keeping themselves updated, while the important purpose of management

scholars (Karunaratne, 2008) is for higher studies. However, the purpose 'keeping themselves up-to-date' is also considered to be important by more than half of the respondents of this study. In general, all the purposes, except 'own PG studies', seem to be important for academics of all levels with the mean values well above 2 ('important' on the 3-point Likert scale).

6.2 Frequency of information seeking

Although, the respondents seek information almost daily for 'teaching' and 'research', it is apparent that they look for information at least monthly for all the purposes, except for their higher studies. As in Figure 1, the frequency of information needed for research work gradually grows with the seniority. This speaks for the increased amount of research work done by the senior academics. In contrast, the frequency of information needed for PG studies drastically drops with seniority, as their enrolments for higher degrees reduce. Similarly, scholarly communications and supervising research projects of the students increase with the seniority. This is because, the seniors perform more researches and those scholarly results are communicated via journal articles, books, conferences, etc. Likewise, compared to junior staff members, seniors tend to guide more students with their research projects, out of their experience in the field.

6.3 Factors influencing the information needs

Demographic factors

The results revealed that the overall information need is highly influenced only by two personal factors: 'age' and 'number of years of experience', and not by others. It is because, the experience in the field exposes the mathematicians to more information, and hence the knowledge of information resources and searching strategies are enhanced. On the other hand, if they have gained considerable amount of information over the years of their service, their search for more information drops, especially for teaching purpose. However, the juniors may seek information on daily-basis to prepare for their lectures and to carry out researches. This compares to the research outputs of Moodley (2013) on the information needs and seeking behaviour, where youngsters seek more information than the seniors.

Professional factors

The tasks such as conducting lectures and assessing students of 'educator' role are performed individually by more than 85% of the respondents, while only 64.8% of the respondents supervise students' projects, as only the senior staff members take up this responsibility. Next, all the tasks of a researcher are also equally performed by most of the respondents. However,

the reviewing of literature is performed only by 75.9% of respondents. This is because, unlike Social Sciences, Mathematics researches are not always based on previous empirical researches. Boutellier, et. al. (2011) clearly distinguishes the independency of Natural Science researches on other observations, or similar research results and participants, in contrast to Social Sciences. It is possible for the researchers in the field of Mathematics to discover new knowledge, merely using the mathematical postulate and models. Finally, out of the three tasks of the 'learner' role, only keeping themselves up-to-date is performed by a considerable number (49.0%) of respondents. It is also found that only 20.7% of the respondents are engaged in their higher studies, and majority of them are the Probationary Lecturers.

In the effort of identifying the information need-triggering work roles and tasks, it was learnt that each work role triggers the needs for information. Further, all the tasks, except 'attending CDP courses', have at least one highly significant association with a purpose of information (Figure 3). Therefore, it can be asserted that the work roles and tasks trigger the needs for the information, as Sapa, Krakowska & Janiak (2014), in their research on mathematicians of Poland, conclude that the tasks performed by the respondents give rise to various information needs.

In conclusion, the mathematicians of the Sri Lankan universities mainly require information for their teaching and research work, which prompt them to seek information on daily basis. Following that, the mathematicians also seek information regularly to keep their knowledge current with the developments in their field. Further, the personal factors such as the age and the academic experience vastly influence the information needs of these academics. The major work roles played by the mathematicians of the Sri Lankan universities are 'educator' and 'researcher' with 'learner' role played by some of them, and all those work roles and tasks identified in this study trigger information needs of several kinds, as discussed under section 5.4.2. The results of this study could be useful not only for the university libraries to plan exclusive services for the mathematicians, but also for those who would like to study the complete information seeking behaviour of the mathematicians of the Sri Lankan universities.

References

Abouserie, H. E. (2007). Information seeking behavior of library and information science faculty in research with a special reference to the use of networked information sources and services: a case study performed at the Graduate School of Library and Information

- Science at The University of Illinois at Urbana-Champaign. *ERIC Online Non-journal article* (ED504186). Retrieved from: <https://files.eric.ed.gov/fulltext/ED499284.pdf>
- Boutellier, R. et. al. (2011). What is the difference between social and natural sciences?. Doctoral seminar paper, Virginia Tech. Retrieved from: https://www.collier.sts.vt.edu/sciwrite/pdfs/boutellier_2011.pdf
- Brindesi, H., & Kapidakis, S. (2011). Information seeking behavior of Greek astronomers. Conference paper: in *First Workshop on Digital Information Management, Corfu, Greece*, 30-31 March, 2011. *e-prints in library and information science (e-LiS)*. Retrieved from: [http:// http://eprints.rclis.org/15852/](http://http://eprints.rclis.org/15852/)
- Gamage, C. (2006). Information needs and information seeking behaviour of environmental scientists in universities in Sri Lanka: major issues and concerns. *Journal of the University Librarians Association of Sri Lanka*, 10, 19-28.
- Haruna, I., & Mabawonku, I. (2001). Information needs and seeking behaviour of Legal Practitioners and the challenges to Law libraries in Lagos, Nigeria. *The International Information & Library Review*, 33(1), 69 – 87. Retrieved from: <https://doi.org/10.1006/iilr.2000.0160>
- Ileperuma, S. (2002). Information gathering behaviour of arts scholars in Sri Lankan universities: a critical evaluation. *Collection Building*, 21 (1), 22-31.
- Jamali, H. R. & Nicholas, D. (2008). Information-seeking behaviour of physicists and astronomers. *Aslib Proceedings*, 60(5), 444-462. DOI: 10.1108/00012530810908184
- Karunaratne, A. (2008). Information-seeking behaviour of university teachers in Sri Lanka in the field Management Studies. *e-prints in library and information science (e-LiS)*. Retrieved from: <http://eprints.rclis.org/12699/>
- Kumar, R. (1999). *Research Methodology: A Step by Step Guide for Beginners* (3rd ed.). London: Sage Publications Ltd.
- Manikandan, G. (2013). *Assessment of information needs and use pattern of biologist of select state universities of Tamil Nadu: an empirical study*. Ph.D. thesis. Tamil Nadu: Annamalai University. Retrieved from: <http://hdl.handle.net/10603/84176>

- Moodley, T. A. (2013). The information needs and information-seeking behaviour of community library users in Msunduzi branch libraries, Pietermaritzburg. Master's thesis. Pietermaritzburg: University of KwaZulu-Natal.
- Ngozi, O. V., Uche, E.-U., & Ejiro, A. K. (2015). Information seeking behavior of faculty members in a Nigerian University. *International Journal of Academic Research and Reflection* 3(4), 95 – 102. ISSN 2309-0405.
- Preez, M. D. (2008). *Information needs and information seeking behaviour of consulting engineers: a qualitative investigation*. Masters dissertation. University of South Africa. Retrieved from:
<http://uir.unisa.ac.za/bitstream/handle/10500/1941/dissertation.pdf?sequen>
- Sapa, R., Krakowska, M., & Janiak, M. (2014). Information seeking behaviour of mathematicians: scientists and students. *Information Research: an international electronic journal*, 19(4), ISSN: 1368-1613.
- Tahir, M., Mahmood, K., & Shafique, F. (2008). Information needs and information- seeking behavior of Arts and Humanities teachers: a survey of the University of the Punjab, Lahore, Pakistan. *Library Philosophy and Practice 2008 (e-journal)*, ISSN: 1522-0222, 227. Retrieved from: <http://digitalcommons.unl.edu/libphilprac/227>
- Thirugnanasundaram, V. (1994). *Information needs and uses of chemists in Sri Lanka*. Master's thesis. Colombo, Sri Lanka: University of Colombo.
- Vakkari, P. (2003). Task-based information searching. *Annual Review of Information Science and Technology*, 37(1), 413-464. Retrieved from:
<https://doi.org/10.1002/aris.1440370110>