

A Conceptual Framework and the Curriculum for Information Literacy Education in the Sri Lankan Universities: A Delphi Study

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Abstract

Information literacy (IL) skills are essential components of the university curriculum which enable to create quality graduates in the time of explosion of information sources, and media. Information Literacy skills are the foundation to deep learning, independent learning, and lifelong learning, resulting in critical and creative thinking skills and problem-solving skills. Students are required to be competent in IL skills such as identify, locate, evaluate, and use information. The Sri Lankan Qualification Framework supports the IL programs extensively. The main objective of this study was to develop an IL conceptual framework and curriculum to guide IL education in the Sri Lankan Universities. Online Delphi surveys were used to collect qualitative and quantitative data. The questionnaire was administered in two rounds. Data was analyzed using descriptive, multivariate statistical procedure and Partial Least Square Structural Equation Modelling. Finally, an IL conceptual framework and the IL curriculum for the Sri Lankan Universities was designed.

Keywords: Information literacy, Information literacy conceptual framework, Information literacy curriculum, Information literacy- Sri Lanka

Introduction

Learning and teaching are mainly based on three domains, namely the cognitive domain, psychomotor domain, and affective domain. In other words, learning empowers students to access knowledge, skills, and attitudes. Further, learning can be categorized into two sections, such as surface learning and deep learning. The Deep learning approach helps students extensively to learn how to create knowledge from the available data and information, while enabling them to develop their genuine understanding. Surface learning happens with teacher-centered rote and memorizing passive learning techniques. As a result, students present or reproduce the same content they memorized, together with their classroom lessons, learned using rote learning practices. But deep learning happens with student-centered resource-based constructive educational principles. The educational structure in the surface learning approach might direct the students to create and present the same information contained in the available information or data. In contrast, the education experts have recognized that the constructive approach to learning, which is linked with deep learning, is the most effective way to learn. In the constructivist approach, the learner plays a major role in constructing knowledge from information and data and the teacher or lecturer plays the role of the facilitator.

Because of the burst of information sources, and the media, the students must be information literate and have the knowledge to navigate, find, retrieve, analyze, and use information, to be productive in an university setting as well as in the office. Information literacy skills are the most essential set of skills necessary for university students to become independent learners. Also, Information literacy skills will enable them to improve their critical thinking and creative thinking skills, which will lead them towards a democratic society.

Academic librarians face the challenge of developing information literacy among university students. Maitaouthong, et al., (2012) emphasized the role of the university library in teaching.

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University students need to acquire information literacy skills not only to achieve academic success in the digital era, but also for the advancement of their future careers, and to participate in a democratic society. Information literacy programs in the university libraries have evolved by improving bibliographic instructions, library orientation, and user education programs. The foundation for information literacy was established in the late 19th century and the early 20th century, by the academic librarians, who perceived the need for students to obtain skills to effectively use libraries and their resources, as a component of their academic purposes. As the Internet and other information technologies emerged, teaching and integrating information literacy into the classroom became an integral part of student learning, lifelong learning, and success in higher education institutions. (Zachery, 2010).

The IL concept has not yet been fully identified and accepted within the Sri Lankan university system. Many of the Sri Lankan university library staff and teaching staff do not pay adequate attention to developing IL skills among the university students, due to numerous reasons such as the lack of directive policy decisions, framework, and curriculum. The library staff is basically engaged with the organization of the library collections and user orientation programs. User orientation programs are mainly focused on the resource location skills of the students. The other areas which come under IL skills, such as the skills to evaluate information critically and competently, and use information accurately and creatively, are not given due emphasis. The necessity and motivation to conduct IL programs needs to be cultivated throughout the entire university sector in Sri Lanka. There is a vacuum at present in the Sri Lankan context, and the responsibility of conducting IL programs has not been delegated to any of the staff members. The literature supports the premise that conducting IL programs is one of the main duties of the university librarians, in collaboration with the academic and administrative staff. The presence of a guiding force, or an official document mandated to launch IL programs in universities, would make the situation different. In the absence of a conceptual framework and the curriculum for IL programs in Sri Lanka, the university libraries are yet not willing to give their whole attention to this matter. Sri Lanka needs a separate framework for the university IL programs because the country's social, cultural, and economic, background is not similar to that of any other country; and also, because most of the university libraries in developed countries have developed their IL frameworks in compliance with the country's educational background. Therefore, this IL conceptual framework will be immensely helpful to all Sri Lankan university libraries to enable them to commence their own IL programs. Since there are no available IL standards laid down for Sri Lanka, the researcher applied the American Library Association (ALA) Association of College and Research Libraries (ACRL) standards for the proposed framework with the written approval of ACRL. Most students in the Sri Lankan state Universities are wanting IL skills and research skills because they have not been taught these skills practically at the school level or university level. Most students are not afraid about the quality of the information they access although they assume that they are the experts in searching for information through the internet. Therefore, it is essential to explore the necessity of establishing an IL program and to propose a common IL framework for the Sri Lankan universities administered by University Grants Commission of Sri Lanka (UGC). In the study carried out by Baruzzi and Calcagno (2015), it was identified that in Nigeria some students never receive library instruction at the undergraduate level and begin their postgraduate studies without having any information literacy skills. Information literacy education in developed countries is well established and information literacy education has been adopted as part of the curriculum; (Banik and Kumar, 2019; Baji et al., 2018) but sadly in Sri Lanka, information literacy education has not yet reached a satisfactory level. The main purpose of this study is to propose a conceptual framework and curriculum to guide IL education in the Sri Lankan Universities. The IL framework and the IL curriculum of the research is based on the agreement of expert panelists.

Literature Review

Information literacy can be identified as one branch of the library and information science discipline. Information literacy practices are very common at different levels in the education system, in developed as well as in developing countries. Higher education administrators, faculty, and librarians have recognized that students need to develop independent and lifelong learning skills to succeed in their academic achievements. In view of the explosion of information sources, and the media, it is essential that university students be information literate and have the knowledge to navigate, find, retrieve, analyze, and use information, to be successful in an academic environment as well as in the workplace. Dixon-Thomas, C. (2012) states that Information literacy is a core competency needed for students to be academically successful in college, and also to cultivate lifelong learning in the workplace and their personal lives.

Information literacy is defined as a set of abilities that requires individuals “To recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information” (American Library Association, 1989, p.2).

The Alexandria Proclamation of (UNESCO, 2005) recognizes information literacy as “a basic human right in the digital world” as it empowers individuals “in all walks of life to seek, evaluate, use, and create information effectively to achieve their personal, social, occupational and educational goals” (UNESCO, 2005, p.5).

Information skills are the basics that pave the way for information literacy skills. Some of the information skills are reading skills, searching skills, writing skills, listening skills, evaluation skills, problem definition skills, brainstorming skills, mind mapping skills, concept mapping skills, note-taking skills, and note making skills synthesizing skills, skills that are associated with using information appropriately and ethically etc. After mastering the practice of these information skills, the students can improve their information literacy skills, such as the ability to locate, access, evaluate, organize, use, and communicate, which will enable them to make decisions and solve problems. Information literate students can distinguish where information is available. They are also aware of search strategies, evaluation tips, organizing skills, communication, and problem-solving skills. Information Literacy skills constitute the basis for critical thinking and problem-solving skills, which enable university students to work as independent learners. Information literacy skills need to be developed among undergraduate students; to develop their higher-order thinking and deep learning, lifelong learning skills, and decision making (Zachery 2010).

Information literacy is necessary to be successful in areas such as research, technology, communication, and lifelong learning (Lau, 2005). Information literacy is a basic competency that is essential for undergraduates to be academically successful in universities, and to cultivate lifelong learning in the workplace, and in their personal lives. Based on the above background information it is obvious that there is a strong need to plan IL programs in all universities and higher education Institutes in Sri Lanka in order to achieve the expected educational goals and objectives. Based on the researcher’s background study, it has been perceived that so far, the information literacy programs in the Sri Lankan University education system have not been established with an empirical framework and curriculum, compared with those of the developed countries. At present some university libraries in Sri Lanka conduct several information literacy programs at different levels, which are referred to as "user education" programs (Ranaweera, 2010). The graduates who pass out from the Sri Lankan universities have to face several challenges, to adjust themselves to the prevailing job market and employer requirements. In 2004, with the specific intention of creating an information literate community in Sri Lanka, The National Institute of Library and Information Sciences (NILIS) of the University of Colombo, Sri Lanka, conducted a workshop on information

literacy, in collaboration with the International Federation of Library Associations and Institutions (IFLA), and the Action for Development Through Libraries Program/ALP. Accordingly, the Empowering 8 Information Literacy model was created for Sri Lanka and other interested countries, to be practiced in their education systems. The empowering 8 Model is a problem-solving model in information-based education. Although the Empowering 8 model was introduced officially by the Ministry of Education for all primary, secondary, and higher education systems in Sri Lanka, there is doubt about its actual usage in these systems. With the changes introduced to the educational sphere, university education in Sri Lanka developed from a teacher-centered rote learning system to student-centered, competency-based, project-based, and problem-based system. Further, development of the soft skills among university students, including information literacy skills, was also emphasized; so as to ensure educational excellence in preparing citizens to achieve success, and lifelong learning skills in the twenty-first century.

In 2005, The University Grants Commission of Sri Lanka introduced essential changes to the university undergraduate courses, and the students were made aware of the new curricula. The main objectives of the reforms were to promote higher-order thinking skills, problem-solving, social and soft skills. Projects and assignments were made compulsory. Thus, it is evident that the information literacy programs that promote the above-mentioned skills should be an integral part of the university curriculum, to enable the students to achieve higher-order thinking skills.

In 2013 (2015 updated version) the University Grants Commission (UGC) of Sri Lanka introduced the Sri Lanka Qualifications Framework (SLQF) to all higher educational institutions in the country, both public and private. Under the SLQF the K-SAM (Knowledge, Skills, Attitudes, Values, Professionalism and Vision for life and, Mind-set and Paradigm) model has been explained, which is essential to achieve the learning outcomes and core competency areas. In the given model, many components are directly interrelated with the information literacy skills of the students. The library and the library staff can help and guide students to improve these skills and their mindset, through IL programs. By abstracting the above definitions and explanations, information literacy can be considered as a fundamental human right of all students.

Research Methods

In this study, the Delphi method is used to forecast the implications for the future with the consensus of the subject experts called Delphi panelists. In this research study, the usage of the mixed method has been considered as most suitable, to prepare the IL conceptual framework and the IL curriculum more comprehensively.

Both qualitative and quantitative elements have been integrated into the Delphi research method. Both inductive and deductive philosophies drive the study which expects to analyze the existing IL theories and practices and design a suitable IL conceptual framework and curriculum for the undergraduate students in the Sri Lankan state universities.

Initially, a panel of experts was engaged to collect the qualitative and quantitative data. Two rounds of data collection were facilitated through questionnaires and responses delivered via electronic mail and online responding. The themes for round two were developed based on the feedback of round one, and panel members were asked to indicate whether they agreed or disagreed with the themes, on a four-point Likert scale.

The Likert-scale questions used in this study covered the quantitative section of the research. The Qualitative section was covered through the opportunity for open-ended comments that were primarily focused on exploration and inductive analysis (Patton, 2002). Therefore, the Delphi technique can be considered as an effective methodology that can be used to draw

consensus from the university librarians and the panelists, concerning the IL conceptual framework and the IL curriculum for undergraduate students. Ludwig and Starr (2005) explained that the basic principle of the Delphi method is that the specialists have the best theory on what the future may convey on any given topic. This study used descriptive statistics to describe the panelists' views about the items of the IL conceptual framework and the IL curriculum.

Mainly, the Decision Delphi was applied to this study in order to reach a consensus on the IL framework and the IL curriculum. The other advantage of the Delphi method is that it allows for flexibility regarding the number of rounds and the number of participants. The Delphi method is based on a structured process that is utilized to gather and filter information from a group of specialists, using a chain of questionnaires. The statistics used in Delphi studies are the measures of central tendency (means, median, and mode) and level of dispersion (standard deviation), to present data regarding the collective judgments of respondents (Clark, 2006).

The Delphi Technique has been used as an investigative method in previous studies carried out regarding information literacy and libraries. For example, Saunders (2009) conducted a Delphi study to determine the role of the academic librarian and the importance of the growth of information literacy over the next decade. Korobili et al. (2008) have researched using the Delphi Technique to investigate attitudes of librarians' preparedness towards information literacy programs in Greece. Xiaomu, et al. (2008) carried out a Delphi study relevant to creating information literacy standards for higher education in China. Dixon-Thomas (2012) has used the Delphi Technique for his study titled "information literacy and the 21st century academic librarian". Doyle (1992) used the Delphi study to develop a consensus on the definition of the term Information Literacy. Choudaha, (2008) used the Delphi method to identify a set of desired professional competencies for an industrial engineer and emerging topics that are required for an undergraduate degree in industrial engineering.

This study consisted of two rounds. After Round 2, the researcher found that the collected data was strong enough to formulate an IL conceptual framework and an IL curriculum, suitable for the Sri Lankan context. Murry and Hammons (1995) defined consensus for their study as the agreement on a particular item by 75% of the participants by the second round or later. Therefore, in this study, it was emphasized that consensus is reached when at least 75% of the panelists rate any framework components and subject components as Very Important (4) or Somewhat Important (3) on a four-point scale at the end of Round 02. The comments received to the open-ended questions of Round 01 were coded and classified into themes and the same themes were incorporated in Round 02 under Likert type questions.

Selection of Expertise (Population and Sample)

It is accepted that panel selection is one of the most critical elements in the Delphi method (Pollard and Pollard, 2008). The experts were selected for the panel based on the following criteria. The Librarians /Acting Librarians or nominees of the librarians who are fully engaged in the IL programs were selected for the research study. In addition to these the Heads of the LIS teaching Institutes and the departments were selected as the panelists as they too were fully engaged in the IL programs. The Sri Lankan University Librarians' Association web directory of 2020 was employed in selecting the expert panelists. All the panelists were individuals who had obtained either post-graduate master's degrees, or a doctorate degree in Library and Information science, having reputed research backgrounds, and an adequate number of publications, having professional experience in the field, and engaged in or have supervised in conducting IL programs, and library leaders as well as decision-makers. All these panelists can be classified under a homogeneous group. In this research the subjects were limited to 24 in the first round, thus covering all the universities and the Institutes that conducted IL programs for undergraduate courses.

Analysis of Data

The data obtained from the questionnaires included qualitative and quantitative data and different statistical analytical procedures were followed according to the types of data. Assuming the multivariate nature of the quantitative data gathered in the study, multivariate data analysis methods and modeling approaches were made on the data. Open-ended responses were analyzed using qualitative methods to construct themes and generalizations. Qualitative approaches (coding) were used to allow an interpretation of responses to the open-ended questions and to make decisions based on a holistic understanding of the context (Creswell, 2005; Pollard and Pollard, 2008). The content analysis technique was used to identify the themes in the answers to the open-ended questions.

The close ended Likert type answers were analyzed by using the measures of central tendency (mean, median, and mode) and level of dispersion (standard deviation and interquartile range) in order to present information concerning the collective judgments of respondents (Clark, 2006; Green et al., 2007). Therefore, descriptive analyses such as frequency distribution with percentiles, mean, median, and mode were carried out for the qualitative data.

Principal Components Analysis

In addition to the descriptive statistical analysis of the data collected from the panelists a multivariate analysis was also performed to explore the patterns of demographic variables reflected from the panelist's responses. The recent literature indicated that there was a growing trend in the use of PCA in library and information science and especially in information literacy as well (Serap Kurbanoglu et al., 2006).

Before PCA analysis, the dataset was split into two sets, each consisting of responses received for the items related to the IL Conceptual Framework and the IL Curriculum. The demographic variables such as gender, age category, number of years in service, and number of publications related to the respondents, served as categorical data. Two separate analyses were carried out on the two subsets of the data to examine the response patterns reflected in the data. The result of the PCA analyses was used to assess the effect of panelists' demographic background on the results obtained from the Delphi analysis. The descriptive and PCA analyses were carried out using SPSS/PC Ver. 20 2018.

PLS-SEM Modelling

The dataset was bootstrapped to increase the sample size before attempting the PLS-SEM modelling and a confirmatory factor analysis was performed on the datasets to confirm the themes in the conceptual framework and curriculum, using factor option of the SmartPLS. The resulted loadings and cross loading were used to select the items from each theme.

Findings

4.1 Current Status of the IL Programs in Sri Lankan State Universities

The researcher conducted online Delphi surveys in order to elicit answers for the following research questions. The first research question of "What is the current status of the information literacy programs being conducted for undergraduates in the Sri Lankan state university libraries?" was inquired in the round one questionnaire. The panelists representing all universities replied that their libraries and Institutes conduct Library orientation programs, once only Information Literacy session, Information Literacy across the curriculum, Credit-bearing Information Literacy courses, non-Credit-bearing Information Literacy courses, and Individual guidance, at different levels. Thus, the answer to the first research question was confirmed in the first round itself.

Among the IL programs listed by the researcher most panelists practiced Library orientation programs and individual guidance. All other listed IL programs too were applied by the panelists at different levels. This is a very positive sign which indicates that the Sri Lankan Universities conduct the same programs as those conducted by the developed countries. But in Sri Lanka information literacy across the curriculum seems to be at a very low level. This is the area which needs to be improved extensively. According to the literature available in other countries, information literacy skills are developed in amalgamation with the main curriculum. Therefore, if the Sri Lankan university libraries can commence credit bearing IL programs in collaboration with the teaching staff, it will motivate the students to carry on the IL programs extensively. At present the university libraries conduct one shot/ once only IL programs, but this is at the initial stage of the IL programs. As a starting point this is acceptable. Wang (2006) identified that students who have successfully followed the library IL courses performed better in their classes and received higher grades.

In addition to the above methods the panelists mentioned that they used the following methods as well. Research Methodology, Reference Manager, Human Library Program, Personal Guidance and advise on Research, how to avoid Plagiarism, Database access, Referencing styles, Searching techniques and Literature search, Use of ICT tools for research purposes, Orientation programs using Scavenger Hunt Library Tour, How to use library/ how to find books/e-resources related to their subject streams through ARG- (Alternative Reality Games), Brainstorming and Mind Mapping Techniques, Planning Orientation programs applying Backward design model etc., Modules in Research Methodology, Reference Manager, Human Library Programs, Personal Guidance and Advise on Research, Research Assistance Service (RAS), Plagiarism/ database access/ referencing styles, how to use LMS in education, Guest lecturers, Online Searching, and Mendeley Reference Management Software.

Considering the above-mentioned IL programs conducted by the universities and the library staff, it can be seen that all the panelists had made very successful attempts to improve IL skills among the university students at different levels and at different stages.

Sixty percent of the panelists responded that they have an IL curriculum for the IL programs. Information literacy standards are applied by several university libraries when conducting IL programs. 21.7 percent of the universities apply ACRL standards for their IL programs. This is the main standard applied by the majority. Over 65 percent IL practitioners had not applied any standards to their IL programs.

Question number 05 of the round 01 was focused on the IL model “Are you following any information literacy models? If yes, please name them” 30.43 percent of the panelists replied that they are following the Empowering 8 IL model. It is a good sign that they are following the Empowering 8 model, which was generated by the National Institute of Library and Information Sciences, University of Colombo, at the conference held in 2004, with the guidance and sponsorship of IFLA (The International Federation of Library Associations and Institutions) and ALP (Action for development through Libraries Program). 34.78 percent of the panelists replied that they do not follow any IL model in their IL programs. 4.34 percent of the panelists replied that they do follow the Big six IL model which is quite popular in other countries. According to the researcher’s perception the IL programs can be conducted successfully by following the IL model as the road map.

Question number 06 was aimed at obtaining a picture about the evaluation and the assessment of students’ achievement after completion of the IL programs. “Do you evaluate students’ satisfaction level regarding the I.L. program?” 69.6 percent of the panelists replied that they do assess the students’ satisfaction level of the IL program, while 30.4 percent replied that they do not assess the students’ satisfaction level. This is a very essential area that is vital to improve the IL programs. If the IL programs are student centered and inquiry based the students’

satisfaction level will be very satisfactory. This means that the IL programs have been successfully conducted with clear objectives.

The modes of conducting IL programs were specified as follows: Lectures, Workshops, Seminars, Library tours, Demonstrations, Classroom exercises, Guiding for the research, Mind mapping, Using social media, Providing printed guides, Library orientation programs, IL instructions combined with the main curriculum, IL instructions not combined with the main curriculum, and Online tutorials. Over 90 percent libraries apply library tours and library orientation programs under IL programs. At the introductory sessions both methods are good, but they do not direct students to the deep learning practices in depth. IL instructions combined with the main curriculum are few and are practiced by less than 22 percent of the libraries.

In addition to the above, the librarians mentioned the following modes of conducting IL programs. “Discussions via Zoom Mode, Using Power Point Presentations and through zoom using short videos of the library services and library tour, Via social media and phone calls, and Online orientation programs due to the closure of the universities during the Covid 19 pandemic situation.

Question number 08 was focused to inquire about the assessment methods used by the panelists to assess the IL programs conducted by them. The panelists responded that they applied the following assessment methods to assess the IL programs and students’ level of achievement. Test at the end of the course, Pre-and Post- test, Questionnaires, Surveys, Portfolios, Case studies, Discussions, Mind maps, Multiple Choice Questionnaires (MCQ), Presentations, Projects, Quizzes, and Worksheets. In addition to the above mentioned methods the panelists replied that they apply the following methods too. “Feedback forms using feedback (google forms), Literature review, In-course assessments”

Surveys, discussions, and questionnaires are the most frequently used methods. Nobody is using diaries/ logbooks and rubrics. Currently, portfolios have been identified as one of the most effective methods to assess the students’ achievement levels. But this method is used by only 4.5 percent. Andretta (2005) identified the portfolio as the assessment method commonly used with IL education. Further she emphasized that a combination of both diagnostic and competence-based assessment methods are useful. Most of the panelists had been using three methods to assess the IL programs. Namely questionnaires, surveys and discussions are being used by over 50 percent of the panelists. All other above-mentioned methods are being used at a very low percentage.

4.2 The Results Obtained from the PCA

The PCA resulted in four PCs explaining 75% of the total variation in the dataset. The first two PCs explained a cumulative variance of 46% of the total variation in the data and these two PCs, i.e., PCA1 and PCA2 were heavily loaded with Q1H, Q1I, Q1J, and Q1P, and Q1M, Q1A, Q1B, and Q1E respectively. The components PCA3 and PCA4 are heavily loaded with Q1C, Q1G, Q1N, Q1F, Q1O, and Q1Q respectively. The PCA3 and PCA4 explained 30% of the total variation in combination.

Figure 01. Biplot: The relationships between the responses to the items related to the Information Literacy conceptual framework. Age, Gender, Service and publications distribution.

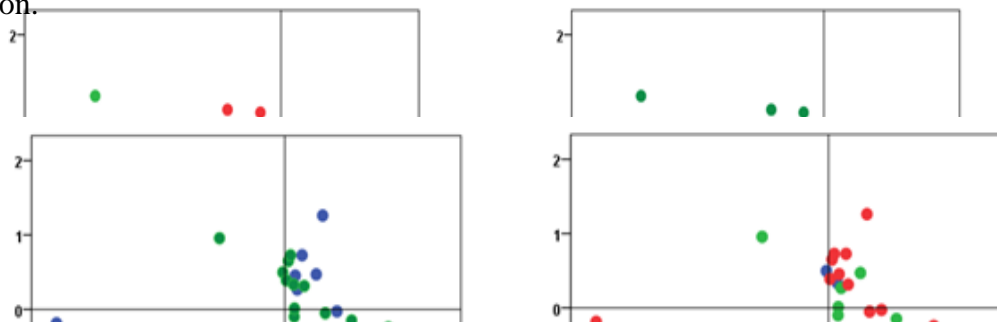


Figure 02. Biplot: The relationships between the responses to the items related to the Information Literacy Curriculum. Gender, Age, Service and publications distribution. Before modeling the cause-effect relationships, data was screened for 12 standard deviations and correlations. The items of zero-standard deviations and the items with a correlation were purged from the dataset. Further, collinearity among the items were accessed and the items of higher collinearity were also removed from the data. A factor analysis was performed to observe the patterns reflected in the items in the dataset. An initial PLS-SEM model was constructed with all the indicators. On this basis, a total of 8 items was filtered out from the dataset for the construction of the final PLS-SEM model.

4.3 Components of the Information Literacy Conceptual Framework and the Skills Required by the Information Literacy Practitioners (Academic Librarians).

The following framework items and the skills were arranged in the order of priority received percentage wise, in the second round.

Collaboration with the University administration, Setting Goals and Objectives for the IL program, Planning skills of the University Librarians, Communication skills, Presentation skills, Teaching skills, Assessment skills, Leadership skills, ICT skills, Evaluation skills, Knowledge on Instructional design, Marketing skills, Collaboration with the teaching faculty, Mission statement for the IL program, Managing the staff, Documentation skills, Librarians Knowledge on educational theories, Negotiation skills, and research skills.

4.4 Components of the Information Literacy Curriculum

In the first round 40 curriculum components were identified. In round two, all items and themes were presented for the panelists to rate each item by importance on the scale. The curriculum items identified cover the knowledge, skills and attitudes of the core concepts of education. The subject items too have changed on par with the development of technology. The curriculum items need to be adjusted with the university mission, goals, and objectives. Therefore, this master curriculum framework is the blueprint for all the universities. The university librarians and the library staff members can apply this framework to the main IL curriculum with the necessary changes.

The following table elaborates the IL Standards, pillars and Learning outcomes.

Standards (ACRL)	Pillars	Learning Outcomes
		At the conclusion of this course, the student should be able to
1. The information literate student determines the nature and extent	Identify	<ul style="list-style-type: none"> To identify the key concepts for the information needed. To recognize information needs.
of the information needed.		<ul style="list-style-type: none"> To develop appropriate searching techniques. To Plan a search strategy To identify different types of resources where information may be found. The ability to construct strategies for locating information To define the topic. To identify the key words. To determine the extent of information needed to develop thesis statement.
2. The information literate student accesses needed information	Access/Locate Information	<ul style="list-style-type: none"> Knowledge about how to conduct effective searches. Able to search databases. Skills to search the internet.

<p>effectively and efficiently.</p>		<ul style="list-style-type: none"> • Skills to search the library catalog and databases. • Access the needed information effectively and efficiently • Understand the ‘advanced’ search options in electronic databases, and the use of Boolean logic. • ICT skills. • Locate needy information quickly, both print and non-print. • Record relevant information through note making or making a visual organizer such as a chart, graph, or outline, etc. • Use current awareness services to set up search alerts. • Know the difference between primary and secondary sources. • Awareness about the Dewey decimal Classification system.
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<p>3. The information literate student evaluates information and its sources critically and incorporates selected information into his or her knowledge base and value system.</p>	<p>Evaluate information</p>	<ul style="list-style-type: none"> • Able to evaluate information and its sources critically. • Able to evaluate reliability, validity, accuracy, authority, timeliness, and point of view or bias. • Able to evaluate information obtained from different sources. • Know the steps to avoid plagiarism. • Evaluate critically the material retrieved from the Web. • Assess the quality of the available information, and if not suitable, re-commence to locate more relevant material. • Able to distinguish between fact, opinion, and fiction.
<p>4. The information</p>	<p>Use and</p>	<ul style="list-style-type: none"> • Skills in academic writing.

<p>literate student, individually or as a member of a group, uses information effectively to accomplish a specific purpose.</p>	<p>Communicate Information</p>	<ul style="list-style-type: none"> • Know how to present information to an audience effectively. • Use information effectively to accomplish a specific purpose. • Lifelong learning skills • Collect appropriate citations. • The ability to organize, apply and communicate information to others in ways appropriate to the situation. • Language skills. • skills to apply information to create new knowledge. • Able to apply information to the problem at hand. • Awareness of bias and authority issues. • Revise and edit the final output with the help of peers and teachers. • Knowledge management skills. • To determine and understand the audience.
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<p>5. The information literate student understands many of the economic, legal, and social issues surrounding the use of information and accesses and uses information ethically and legally.</p>	<p>Accesses and uses information ethically and legally</p>	<ul style="list-style-type: none"> • Able to cite bibliographic references in assignments, reports, and theses. • Able to use references according to the referencing style. • Able to understand issues of copyright and plagiarism. • Use the information found, ethically and responsibly.
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Discussion, Recommendation and Conclusion

The most important outcomes of this study are the IL conceptual framework and the IL curriculum that have been formulated for the Sri Lankan university undergraduates. The sample curriculum can be used by the individual universities to implement their own IL programs or revise their current IL programs after assessing the existing gaps.

The Sri Lanka Qualification Framework presented in 2015 by the University Grants Commission in order to improve the quality of education, requires the direct and indirect support from the University libraries and the library staff. Therefore, while providing world

class library services the library academic staff need to take additional steps and responsibility to improve the Information Literacy skills among the lecturing staff as well as among the students, at all levels in the universities, especially among the undergraduate level students. Thus, the best approach to create an information literate university community is to apply this proposed conceptual framework and the curriculum to undergraduate education in the Sri Lankan universities.

To fill the existing lacuna in the educational reforms, the UGC and all the universities need to implement more advanced information literacy programs than those available at present. The UGC needs to give the required authority to the librarians and empower them to commence the programs with credit values, encompassing all students at all levels and years, or semesters.

Subject specialists such as Deputy librarians, Senior assistant librarians, and Assistant librarians should take the responsibility for one faculty or department each, to implement information literacy programs with the curriculum integrated teaching programs, in collaboration with the lecturing staff.

This research has presented an essential IL conceptual framework and IL curriculum for the Sri Lankan university undergraduate programs. If all the universities, Institutes, Campuses and other departments commence Information literacy programs for the students according to the Information Literacy Competency Standards for Higher Education by ACRL/ ALA (2000), it would enable to enhance the students' capabilities regarding the skills such as Determine the extent of information needed, Access the needed information effectively and efficiently, Evaluate information and its sources critically, Incorporate selected information into one's knowledge base, Use information effectively to accomplish a specific purpose, Understand the economic, legal, and social issues surrounding the use of information, and Access and Use information ethically and legally.

More research needs to be carried out regarding the Sri Lankan university students' IL skills and their actual IL requirements. Due to time limitations this study did not focus on the IL requirements from the viewpoint of the students. The following recommendations are made based on the research findings.

1. To narrow down and prepare a year, semester, faculty, subject based information literacy program based on a well-prepared curriculum.
2. To implement this conceptual framework and the curriculum in all the universities with the applicable changes.
3. To train the librarians and the library academic staff on the skills required by them about the items of the framework in this research.
4. To seek the effectiveness of the information literacy framework and the curriculum after implementation.
5. To give a training on teaching learning and assessment methods of information literacy for all the university librarians and academic library staff.
6. Make it mandatory for the academic library staff to obtain the certification of CTHE (Certificate in Teaching Higher Education) conducted by the universities for confirmation in employment.
7. The university librarians, faculty staff and the university administration need to collaborate with each other in order to conduct successful IL programs.

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