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Measuring the levels of sources of ICT self-efficacy among the humanities and social Sciences undergraduates in Sri Lanka

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Abstract

Measuring the levels of sources of ICT self-efficacy of undergraduates in Humanities and Social Sciences (HSS) of universities especially in Sri Lanka has not been adequately explored. In this study, therefore it is aimed to make an effort to address this important issue. The main objective of this research study was to identify the levels of the factors that are affecting the ICT self-efficacy among the HSS undergraduates in Sri Lanka and the differences between the factors based on the university. The survey research design was employed and final year HSS undergraduates from four universities were selected randomly, out of ten universities where HSS streams are taught. The sample included 604 undergraduates. Data gathered through structured questionnaire was piloted and validated. The data were subjected to descriptive statistics. The results identified four factors affected with the efficacy level of the undergraduates. It indicated that the ICT Self-efficacy levels and ICT Anxiety were varying between less (22%) and highest (50%) across universities. Factors such as ICT Training (27%) and Library Support provided (32%) by the universities were also in the lowest level. The ICT Self-efficacy was low (29%) among students who used the library 'rarely' (< 2 per week) and average level of anxiety 47%. ICT Anxiety and ICT Self-efficacy were the most strongly correlated factors in the study (-0.144, p = 0.01). However, the gender was largely diluted and not correlated with self-efficacy. The introduction of effective Library Support and ICT Training would help reduce the higher levels of ICT Anxiety and improve the ICT

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Self-efficacy level among undergraduates. The study recommends conducting a cross-sectional, longitudinal research study to better understand the levels of ICT Anxiety, ICT Training and the Library Support.

***Keywords*:** Affecting Factors, Humanities and Social Sciences, ICT Self-efficacy, Sources of Self-efficacy, Undergraduates.

Introduction

The concept of "Self-efficacy" refers to an individual's belief in his or her ability in successfully performing a specific behaviour (Bandura, 1977). Specifically, self-efficacy is a personal judgment or a self-evaluation of a person's capabilities or competence to successfully organise and execute a course of action required to attain designated types of performances (Bandura, 1986, 1997). Thus, self-efficacy is a multi-dimensional construct that varies according to the domain of demands (Zimmerman, 2000). An important theoretical property of perceived self-efficacy is that it is concerned not with the skills a person has, but with judgments of what one can do with whatever skills he or she possesses (Bandura, 1986, 1997, 2006). Moreover, self-efficacy refers to an individual's convictions about her/his abilities to mobilize the motivation, cognitive resources, and courses of action needed to execute a task within a given context (Bandura, 1989).

Meanwhile, ICT self-efficacy is an individual's belief regarding his/her ability to utilize ICT, and plays a positive, significant role in making decisions involving ICT adoption and usage (Compeau & Higgins, 1995; Torkzadeh Chang & Demirhan, 2006; Papastergiou, 2010). ICT self-efficacy is considered to be far more important than competence in specific ICT skills, given that individuals with high ICT self-efficacy have adequate flexibility and the confidence to adapt to the constantly changing landscape of ICT applications (Sam, Othman & Nordin, 2005).

Sri Lankan university libraries allocate considerable amount of funds to provide ICT facilities to upgrade information access within the system. Even though Sri Lankan universities have introduced ICT skills programs to enhance students' technical competency, a number of aspects await for an in-depth investigation (Hewagamage, 2009; Jayasuriya, 2008; Punchihewa, 2008). Among these aspects: "Are the Sri Lankan HSS undergraduates self-efficacious in using library ICT effectively?" and "what are the factors contribute to the effective usage of ICT in the library?" require thorough investigation to measure users' judgment or level of their self-efficacy to improve the confidence in using ICT. The self-efficacy is said to be based on four principal sources of information and these four major sources directly or indirectly help improve the self-efficacy level of undergraduates. Consequently, the present study was carried out with the principle objective

of measuring the levels of user capability or self-efficacy levels of HSS undergraduates.

According to Bandura (1977), Bong and Skaalvik (2003) self-efficacy theory suggests that there are four main sources of information used by individuals when forming self-efficacy judgments. The four main sources of information in self-efficacy theory are:

Mastery experience - The most effective way to create a strong sense of efficacy is through mastery experiences. (i.e., past experiences with the specific task being investigated). (Gist & Mitchell, 1992; Saks, 1995).

Vicarious experience - The second way of creating and strengthening self-beliefs of efficacy is through the vicarious experiences provided by social models, which are gained by observing others perform activities successfully. This is often referred to as modelling, and it can generate expectations in observers that they can improve their own performance by learning from what they have observed (Gist and Mitchell, 1992).

Social persuasion - Social persuasion is the third, and it refers to activities where people are led, through suggestion, into believing that they can cope successfully with specific tasks. Coaching and giving evaluate feedback on performance are common types of social persuasion (Bandura, 1977; Bandura & Cervone, 1986).

People's anxiety - People interpret their anxiety reactions and tension as signs of vulnerability to poor performance. In activities involving strength and stamina, people judge their fatigue, aches and pains as signs of physical debility. Mood also affects people's judgments of their personal efficacy. Positive mood enhances perceived self-efficacy, and despondent mood diminishes it (Bandura, 1988).

According to Bandura (1994), experiencing easy successes may undermine the development of self-efficacy through the expectation of similar results in the future. Therefore, the present study analyses the levels of these four

efficacy factors and their relationship with the efficacy factors and gender of the study sample.

Research Objectives

The principle objective of the study was to measure the ICT self-efficacy levels of HSS undergraduates in Sri Lanka. More specifically, the following research questions were addressed.

1. Is the variation of efficacy levels of undergraduates among universities is equal?
2. Is there association/s between the efficacy levels and frequency of library use?
3. What is the relationship between gender and the efficacy factors?
4. What are the differences in constructs of self-efficacy among the universities?
5. Is there a correlation between students' self-efficacy levels and their Electronic Information Resources (EIR) usage in the university?

Literature Review

Self-efficacy in computer and Internet related usage has commonly been researched in the field of Information Systems (IS). Early research defines the Computer Self-Efficacy (CSE) construct as "an individual judgment of one's capability to use a computer" (Compeau & Higgins, 1995, 192). A number of studies show that CSE plays a significant role in an individual's decision to use computers (Hauser, Paul & Bradley, 2012; He & Freeman, 2010; Hong et al. 2012; Paraskeva, Bouta & Papagianni, 2008; Simsek, 2011; and Shu, Tu & Wang, 2011). These studies provide initial evidence that CSE has an important influence on individual reactions pertaining to computing technology. Meanwhile, the Internet self-efficacy is "the belief in one's capabilities to organize and execute courses of Internet actions required to produce given attainments" (Eastin & LaRose, 2000, 1). In this study, the literature related to Computer self-efficacy and Internet self-efficacy has been reviewed and identified the different factors of ICT self-efficacy. The sources of literature are listed in Table .1

Table 1. Literature related to computer and internet self-efficacy in relation to different domains

	Domain	Supportive References
1	Training / Training programs	Compeau & Higgins, (1995); Kastern & Ruth, (1998); Durndell, Haag & Laithwaite, (2000); Ren, (2000); Torkzadeh & Dyke, (2002); Durndell & Haag, (2002); Combs & Luthans, (2007); Paraskeva, Bouta, & Papagianni, (2008); Liang & Tsai, (2008); Shu, Tu, & Wang, (2011); Chien, (2012)
2	Organizational Support / Encouragement by others	Compeau & Higgins, (1995) , Eastin & LaRose , (2000); Ren, (2000); Shu, Tu, & Wang, (2011)
3	Anxiety / Computer Anxiety / Trait Anxiety	Compeau & Higgins, (1995) , Eastin & LaRose, (2000), Durndell & Haag, (2002), Sam, Othman & Nordin, (2005); Zajacova, Lynch, & Espenshade, (2005), Simsek, (2011); Hauser, Paul,& Bradley, (2012); Hong et al., (2012); Shu, Tu, & Wang, 2011)
4	Self-efficacy & EIR/ Web based/e- Learning	Ren, (2000); Chien, (2012)
5	Gender	Combs & Luthans, (2007), Durndell, Haag & Laithwaite, (2000), Durndell & Hagg, (2002), He & Freeman, (2010), Karsten & Ruth, (1998), Kinzie, Delcourt, & Power, (1994), Sam, Othman, & Nordin, (2005), Simsek, (2011), Shu, Tu, & Wang, (2011), Torkzadeh & Dyke, (2002), Zajacova, Lynch, & Espenshade, (2005)

Considering the four main sources of self-efficacy as described in the self-efficacy theory of Bandura (1977), the following discussions explained the factors that are reported in the literature.

In the case of mastery experience, CSE positively correlates with an individual's willingness to participate in activities, with computer-related difficulties (Compeau & Higgins, 1995; Eastin & LaRose, 2000). Internet self-efficacy focuses on individual's belief about his/her ability to accomplish an effective online search yielding the most relevant set of data or documents to fulfil their information needs.

The effectiveness of vicarious experience in increasing feelings of self-efficacy is often linked to similarities in personal characteristics between the observer and the person being observed. Therefore, being able to experience others' effective support can potentially affect an individual's own self-efficacy beliefs (Tokzadeh, Chang, & Demirhan, 2006; Murphy et al., 1989).

The social persuasion can be increased among students through training. The availability of appropriate training and the methods used in training can influence levels of self-efficacy (Ren, 2000). It is observed that ICT training programs for undergraduates have developed improve their academic performance through significantly increased level of ICTSE during the training, especially in the areas of practice and the increase in feelings of competency in the use of technology (McElory, 2002).

Feelings of anxiety surrounding computers are expected to negatively influence computer use (Compeau & Higgins, 1995). Self-efficacy theory predicts that high computer anxiety should lead to lower self-efficacy. Thus, it posits a strong negative relationship between self-efficacy and anxiety and have moderate to strong negative correlations (Sam et al., 2005).

Moreover, gender with the self-efficacy factors were analysed by many authors (He and Freeman, 2010; Simsek, 2011; Shu, Tu, and Wang, 2011; Hatlevik et al., 2018).

Correlation among the sources of self-efficacy also has been reported by many researchers. Karsten and Roth (1998) found that prior computer experience is significantly and positively correlated with the pre-test of CSE. Therefore, it was expected that students with more computer experience tend to have a higher initial level of computer self-efficacy and a higher level of

confidence to use computers properly. Sam et al. (2005) found a significant relationship between computer anxiety and attitudes towards the Internet. Chien (2012) reported that a favourable learning environment and training courses enabled users to become familiar with fundamental library operations. Eastin and LaRose (2000) found that Internet-stress and self-disparagement exhibited a negative relationship to Internet self-efficacy.

Methodology

The study employed survey research design to investigate the four sources of self-efficacy related to HSS undergraduates. According to the sources of self-efficacy theory, the study constructed the measures such as ICT self-efficacy (ICTSE), ICT Anxiety (ANX), Library Support (LS) and ICT Training (TR) based on the literature using five-point Likert scale.

The sample included the 4th year (final) undergraduates from the Faculties of HSS of four universities in Sri Lanka since they have four years of experience using the library resources. The sample was selected according to the rule defined by Hair et al. (1995), as the method of "five subjects for one element" to determine the total number of subjects for the sample of the main survey.

Out of the ten universities where HSS streams are available, four universities i.e., University of Peradeniya (PDN), University of Sri Jayewardenepura (SJP), University of Ruhuna (RUH) and Rajarata University of Sri Lanka (RJT) were chosen for the study.

The required sample for the study was determined according to Krejcie and Morgan (1970) sampling table. The sample size for a population of 1500 was 759 at 95% confidence and 2.5% marginal error. By adding 10% respondent to maintain higher return rate, a minimum of 840 respondents were taken. Stratified sampling method was employed and the sample was selected from-Final-year students enrolled in the academic year 2015/2016 HSS faculties, to represent all departments in each selected faculty. Data were collected by the researcher herself. Participants were convinced of the importance of their participation in this type of research. Sample characteristics are shown in Table 2.

Table 2. The total population size, and sample size

University	Total number of students	Sample size	Percentage (%)
University of Peradeniya	535	325	39
University of Sri Jayawardenapura	512	311	37
University of Ruhuna	227	138	16
Rajarata University of Sri Lanka	107	66	8
Total	**1381**	**840**	**100%**

The development of ICT self-efficacy (ICTSE) scale was based on the items of Computer self-efficacy developed by Murphy, Coover & Owen (1989) and Internet self-efficacy (ISE) items developed by Hsu & Chiu (2004). This ICTSE scale included 23 items. The ICT Anxiety scale incorporated items from Heinssen, Glass & Knight's (1987) Computer Anxiety Rating Scales. After few modifications according to the experts' view and reliability analysis of the study, 10 items out of 21 were chosen. The library support measure was developed with 15 items were selected. ICT Training scale included 03 items. All four measures were included in a 5 point Likert scale.

Validation of the tool

A pilot survey was conducted with 100 students from four universities during 2015/2016 academic year and content and face validity was established. The reliability analysis indicated as Chorbach's $\alpha = 0.94$. The efficacy items in the main survey questionnaire were reviewed and refined by ICT experts working in library ICT divisions of the four university libraries.

Statistical applications

The main survey used 604 undergraduates. Since each efficacy scale has a different number of items, the total score range for each individual item of the scale could be in the range of 3-115 range. As the responses were given on a 5-point Likert scale, each scale has a different mean level, with distinct minimum and maximum values (Lian & Tsai, 2008). The responses ranged

from 1= Not at all confident to 5= Very Confident. The efficacy levels of the students were measured by the item mean of each scale indicated in Table 3.

Table 3. Descriptive statistics of scales used in the study

Name of the efficacy scale	No. of Items	Response category	Possible Item Mean
ICT Self-Efficacy **(ICTSE)**	23	1-5	23, 1.04, 1.65, 2.39,.. 4.86, ...**115**
ICT Anxiety **(ANX)**	10	1-5	10, 2.8,…3.5, 3.9…4.3, 4.9, .. **50**
Library Support **(LS)**	07	1-5	7, 1.14,...2.71,...3.71, 4.85, ... **35**
Training **(TR)**	03	1-5	3, 1.3,..1.6…2.3, ...3.33, 4.3…**15**
Total	**43**		

The collected data were subjected to statistical procedures of frequency distribution. The students' ability levels and judgment of their abilities for each efficacy scale were measured *via* descriptive statistics. The SPSS Ver. 20 software was used to perform all the computations in this research.

After calculating the mean score for each item in the scales, Pearson correlations between four scales were calculated to identify the interrelationship.

Identified self-efficacy items of the study

By employing confirmatory factor analysis, the four scales were finalised and thereafter, the items were purified for the final analysis. Then the efficacy items featured in the ICT self-efficacy, ICT Anxiety, Library Support and ICT Training were finalised (Table 4).

Table 4. Finalised four scales for the study

Item	Statements
	ICT self-efficacy - I feel confident:
ICTSE1	working on a personal computer (Microcomputer)
ICTSE2	moving the cursor around the monitor screen
ICTSE3	understanding terms/ words relating to computer
ICTSE4	open a saved file to view on a computer monitor screen
ICTSE5	entering and saving data (number and words) into a file
ICTSE6	copying an individual file to another place
ICTSE7	copying into a disk/CD /pen drive from a computer
ICTSE8	adding and deleting information to and from a data file
ICTSE9	using computer to organize and manage files
ICTSE10	making selections from an on-screen menu
ICTSE11	using the computer to write a letter or essay
ICTSE12	saving a file from a hard disk/ CD/ pen drive etc.
ICTSE13	learning to use library software (OPAC) in the computer
ICTSE14	logging into library computer network
ICTSE15	getting library software (OPAC) up and running
ICTSE16	finding relevant data from the OPAC
ICTSE17	make an e-mail account in the computer
ICTSE18	saving the e-journals in a computer
ICTSE19	attaching files to an e-mail
ICTSE20	navigating the World Wide Web by following hyperlinks
ICTSE21	visiting a Web site by entering its address (URL) in the browser
ICTSE22	finding information by using a search engine
ICTSE23	exchanging messages in a mail

	ICT Anxiety - I feel confident:
ANX1	I do not think I would be able to learn OPAC
ANX2	the challenge of learning about finding information is exciting
ANX3	I am confident that I can learn these new technologies
ANX4	anyone can learn to use e-journal is they are patient and motivated
ANX5	I am sure that with time and practice I will be as comfortable working with technologies as I am in working by hand
ANX6	I scares me to think that I could cause the ICT to destroy a large amount of information by hitting the wrong key
ANX7	I hesitate to use OPAC for fear of making mistakes
ANX8	you have to be a genius to understand all the special keys contained on most computer terminals
ANX9	if given the opportunity, I would like to learn more about search engines
ANX10	I have avoided to use e-mails because the information are not understanding
	Library Support - I believe that:
LS1	library provides enough staff to help us in getting the e-information
LS2	library staff provide enough e-facilities to get information
LS3	all of the staff have enough knowledge to find EIR
LS4	some ICT facilities need to be improved by the library staff
LS5	I learn the e-journal services through orientation sessions
LS6	the staff always willing to provide the ICT services
LS7	no need external support to use the ICT and EIR services

	ICT Training - I believe that:
TR1	if I have learned how to use the computers in the library
TR2	at least if the library provides a brochure/ leaflet/ guiding material about EIR
TR3	if the library had trained me on how to do searches in www

Results and Discussion

Profile of the respondents

Out of 604 respondents, 21.7% were male students, while 78.3% were female. Majority of (91.7%) respondents had Sinhala as their native language. A fraction of 6.1% had English language and 2% had Tamil language. A negligible number of respondents (0.2%) did not specify the language. The instructional language of respondents varies across the sample and the majority is pursuing their studies in Sinhala medium (86.6%); English medium (11.6%), while 1.8% in Tamil medium. The catalogue-searching patterns show that 37.6% of respondents use both the card catalogue and OPAC; 37.3% use the card catalogue only; and 25.1% of respondents use only OPAC. The frequency of library use; 31% use the library frequently (5-7 days per week); 55.3% use it moderately (3-4 days per week) and 13.7% use it rarely (1-2 days per week).

The efficacy levels of undergraduates among universities

The participants' responses to the four efficacy scales were calculated and the levels of the efficacy scales (Lian & Tsai, 2008) are shown in Table 5. Accordingly, the ICT self-efficacy of almost all university undergraduates were considerably higher; the mean score ranged from 81-95, with a maximum level of 115, and the overall percentile value was 78. The PDN and RJT university respondents achieved high levels of ICT self-efficacy compared to students from the SJP and RUH universities.

The participants' ICT Anxiety levels indicated low level of anxiety, except for RJT students, whose mean score was 30 (60%). However, overall results of the analysis showed that students across all four universities reached to moderate level (50%) of ICT Anxiety.

The mean score for the Library Support scale was 68%, indicating that these undergraduates do receive Library Support to use ICT. All of the participants indicated that they have received a moderate Library Support (66-71%).

Table 5. Efficacy levels of undergraduates among the universities

University		ICTSE (115)*	Level %	ANX (50)*	Level %	LS (35)*	Level %	TR (15)*	Level %
PDN	Mean	4.14		2.42		3.54		3.60	
	Std. Dev.	0.81		1.11		0.58		0.87	
	Minimum	1.78		1.00		2.29		1.00	
	Maximum	5.00		4.90		5.00		5.00	
Mean x Number of items		**95**	**82**	**24**	**48**	**25**	**71**	**10**	**66**
SJP	Mean	3.88		2.49		3.42		4.08	
	Std. Dev	0.83		1.03		0.63		0.94	
	Minimum	1.04		1.00		1.14		1.00	
	Maximum	5.00		5.00		4.86		5.00	
Mean x Number of items		**89**	**77**	**24**	**48**	**24**	**68**	**12**	**80**
RUH	Mean	3.56		2.37		3.37		3.18	
	Std. Dev	0.84		0.94		0.58		0.83	
	Minimum	1.17		1.00		2.00		1.00	
	Maximum	4.91		5.00		5.00		5.00	
Mean x Number of items		**81**	**70**	**25**	**50**	**23**	**66**	**09**	**60**
RJT	Mean	3.98		3.05		3.45		3.85	
	Std. Dev	0.64		0.78		0.52		0.92	
	Minimum	2.74		1.20		2.29		1.67	
	Maximum	4.83		4.80		4.57		5.00	
Mean x Number of items		**91**	**79**	**30**	**60**	**24**	**68**	**11**	**73**
Total	**Mean**	**3.92**		**2.50**		**3.45**		**3.71**	
	Std. Dev	0.83		1.03		0.59		0.95	
	Minimum	1.04		1.00		1.14		1.00	
	Maximum	5.00		5.00		5.00		5.00	
Mean x Number of items		**90**	**78**	**25**	**50**	**24**	**68**	**11**	**73**

*(Maximum item Mean)

The ICT Training scale shows that students from the SJP University have achieved a high level of ICT Training, whereas students from the other three universities have only received a moderate level of Training. In brief, 73% of undergraduates believe that they need training offered by the libraries of the

universities. This was a major requirement of library users, and according to the results of the study, provision of necessary training to alleviate their ICT Anxiety and address the problem of lack of support.

The efficacy levels of undergraduates based on frequency of library use

The results of analysis of frequency of library use and the level of efficacy for each scale is shown in Table 6.

Table 6. Efficacy levels of undergraduates based on frequency of library use

University	Frequency Level		ICTSE 115	%	ANX 50	%	LS 35	%	TR 15	%
PDN	Frequently	Mean	4.34	**87**	2.32	**46**	3.58	**71**	3.87	**77**
(7-5 days per week)		Std. Dev.	0.69		1.17		0.58		0.85	
	Moderately	Mean	4.09	**82**	2.44	**48**	3.52	**70**	3.46	**69**
(4-3 days per week)		Std. Dev.	0.79		1.09		0.59		0.85	
	Rarely	Mean	2.82	**56**	3.11	**62**	3.41	**68**	3.08	**62**
(2-1 days per week)		Std. Dev.	0.99		0.55		0.36		0.64	
SJP	Frequently	Mean	3.98	**79**	2.14	**42**	3.64	**73**	4.07	**81**
(7-5 days per week)		Std. Dev.	0.95		1.15		0.59		0.88	
	Moderately	Mean	3.90	**78**	2.59	**52**	3.45	**69**	4.12	**82**
(4-3 days per week)		Std. Dev.	0.71		0.96		0.56		0.92	
	Rarely	Mean	3.76	**75**	2.55	**51**	3.16	**63**	4.02	**80**
(2-1 days per week)		Std. Dev.	0.97		1.05		0.73		1.03	
RUH	Frequently	Mean	4.10	**82**	1.9	**38**	3.34	**67**	3.38	**68**
(7-5 days per week)		Std. Dev.	0.56		0.68		0.44		0.75	
	Moderately	Mean	3.32	**66**	2.51	**50**	3.40	**68**	3.23	**64**
(4-3 days per week)		Std. Dev.	0.84		0.96		0.65		0.65	
	Rarely	Mean	3.37	**67**	2.77	**55**	3.34	**67**	2.62	**52**
(2-1 days per week)		Std. Dev.	0.79		0.99		0.55		0.73	
RJT	Frequently	Mean	4.01	**80**	3.39	**68**	3.55	**71**	3.85	**77**
(7-5 days per week)		Std. Dev.	0.71		0.59		0.52		0.95	
	Moderately	Mean	4.02	**80**	2.66	**53**	3.47	**69**	3.82	**76**
(4-3 days per week)		Std. Dev.	0.57		0.89		0.44		0.96	
	Rarely	Mean	3.58	**72**	2.74	**55**	2.74	**55**	3.93	**78**
(2-1 days per week)		Std. Dev.	0.33		0.09		0.39		0.59	
Total	**Frequently**	**Mean**	4.16	**83**	2.39	**47**	3.54	**70**	3.82	**76**
(7-5 days per week)		Std. Dev.	0.75		1.11		0.55		0.88	

Moderately	**Mean**	3.87	**77**	2.52	**50**	3.47	**69**	3.67	**73**
(4-3 days per week)	Std. Dev.	0.81		1.00		0.58		0.95	
Rarely	**Mean**	3.57	**71**	2.66	**53**	3.20	**64**	3.62	**72**
(2-1 days per week)	Std. Dev.	0.95		0.97		0.66		1.08	
Total		**3.92**	**78**	**2.50**	**50**	**3.45**	**69**	**3.71**	**74**

According to the above table, the ICT self-efficacy of almost all university undergraduates was considerably higher; the mean score ranged from 81-95, with a maximum level of 115 and the average value was 78%. The PDN and RJT university respondents indicated high levels of ICT Self-efficacy compared to students from the SJP and RUH universities.

According to the Table 6, the mean level of students' ICT Self-efficacy was low among all students who used the library 'rarely' (29%). However, the mean levels for frequent and moderate users were high at 83% and 77%, respectively.

Comparatively, ICT Anxiety level also indicated a quite high mean level for undergraduates who use library rarely than the mean level of frequently and moderately used users. However, the overall percentage for ICT Anxiety level was 50% across all four universities; this represents the average level of anxiety during their use of ICT at the library. The highest level was 55% in RJT and RUH universities where students rarely used the library. This indicates that, compared to students who frequently used library resources, the students who moderately and rarely used the library required more support (55-68).

According to the ICT Training scale, most students desire training in ICT use. The value of the overall ICT training scale was high (74%), further supporting the belief that users need ICT Training on library services with the help of staff support. A comparison of students' responses from the PDN and RUH universities reveals that they require ICT Training less frequently than those from the SJP and RJT universities.

The efficacy measures and gender

To identify the relationship between gender and the efficacy factors, the t-test was applied and variation of efficacy levels of different scales across gender dimension of the HSS undergraduates is shown in Table 7.

There were no statistically significant differences in ICT self-efficacy, ICT anxiety, library support, and ICT training with respect to gender ($p \geq 0.05$).

Table 7. Variation of scale levels across gender of the HSS undergraduates

Scales	Sum of Squares	Df	Mean Square	F	Sig.
ICTSE					
Between Gender	0.759	1	0.759	1.095	n. s.
Within Gender	416.887	602	0.693		
Between Gender	0.037	1	0.037	0.034	n. s.
Within Gender	644.743	602	1.071		
LS					
Between Gender	0.477	1	0.477	1.351	n. s.
Within Gender	212.614	602	0.353		
ICTTR					
Between Gender	0.332	1	0.332	0.367	n. s.
Within Gender	544.844	602	0.905		

s = Significant at $p \leq 0.05$
n.s = Significant at $p \geq 0.05$

Differences among the constructs

The results of the ANOVA shown in Table 8 reveal that the ICT Self-efficacy, ICT Anxiety and Training constructs of four Sri Lankan universities vary significantly across the factors. The library support indicates no statistically significant difference ($p > 0.05$). Therefore, the results revealed that three factors vary with significance among the four universities. Sam et al., (2005) reported that there was a difference of CSE based on faculty.

Table 8. One-way ANOVA performed on four constructs between Universities

Scales	Sum of Squares	df	Mean Square	F	Sig.
ICT Self-efficacy (ICTSE)					
Between Universities	26.145	3	8.715	13.356	s
Within University	391.501	600	0.653		
ICT Anxiety (ANX)					
Between Universities	21.510	3	7.170	6.902	s
Within University	623.270	600	1.039		
Library Support (LS)					
Between Universities	2.586	3	0.862	2.457	n.s.
Within University	210.505	600	0.351		
ICT Training (TR)					
Between Universities	67.059	3	22.353	28.051	s
Within University	478.118	600	0.797		

s = Significant at $p \leq 0.05$
n.s = Significant at $p \geq 0.05$

The Correlation between Self-efficacy and ICT Usage

The two tailed Pearson product moment correlations between four constructs were calculated to identify the interrelationships. The mean, standard deviation, and correlation coefficient for each variable are listed in Table 9.

Students' ICT Self-efficacy was positively correlated to Library Support and ICT Training. Negative statistically significant correlations between ICT Self-efficacy and ICT Anxiety (-0.244; p = 0.01) can also be seen. The correlating between ICT Anxiety with Library Support was positive and statistically significant at p = 0.01 (Table 8). Further, ICT Training and ICTSE were positively correlated (0.172, p = 0.01). The outcome of the correlation analysis indicates that ICTSE is positively influenced by ICTTR and LS, while ICT Anxiety is negatively influenced the ICTSE.

Table 9. Correlation coefficient between self-efficacy and EIR constructs

**. Correlation is Significant at the p ≤ 0.01 level (2-tailed)

Scales	TR	ICTSE	ANX	LS	Mean	Std.dev.
TR	1				3.7163	0.95085
ICTSE	0.172**	1			3.9220	0.83223
ANX	0.034	-0.244**	1		2.5041	1.03406
LS	0.060	0.208**	-0.035**	1	3.4591	0.59446

* . Correlation is Significant at the p ≤ 0.05 level (2-tailed).

TR - ICT Training
ICTSE - ICT Self-efficacy
ANX - ICT Anxiety
LS - Library Support

Discussion

The aim of this study was to examine Sri Lankan HSS undergraduates' self-efficacy levels when using university libraries. According to the analysis of levels of Self-efficacy, it seems to be high and less varying among universities. Meanwhile, the levels related to ICT Anxiety showed the highest variation within the universities. Similarly, regarding Library Support and ICT Training also indicated poor levels in these universities. Specially, the Library Support is noticeable from the rest of the levels of the scales having the lowest value. This discrepancy in levels of efficacy in scales across the universities could be a result from the variation in the infrastructure facilities and the training available in these universities, which require further studies. The findings demonstrate that training should be a priority for library users with access to ICT services (Compeau & Higgins (1995); Eastin & LaRose, (2000); Ren, (2000); Shu, Tu, & Wang, (2011). The provision of adequate ICT Training would be helpful in minimising the need for Library Support through library staff, which would lead to decrease ICT Anxiety felt by students, and increase students' ICT self-efficacy levels.

The relationship between frequency of library use and the Undergraduates' efficacy levels of each scale showed that there was a close association. In general, the mean levels of constructs were higher in users with frequent and moderate library use. Comparatively, ICT Anxiety level also indicated a quite

high value for undergraduates irrespective of the university. A comparison of student responses reveals that PDN and RUH universities required less ICT Training than that of SJP and RJT universities. These findings imply that training should be prioritized for library users with respect to ICT.

The variation between gender and the four mean levels of efficacy scales revealed that there was a statistically insignificance difference. In general, He and Freeman (2010) reported the same result that gender is not correlated with computer self-efficacy. In addition, other constructs such as Library Support, ICT Training and ICT Anxiety contribute less in distinguishing the female and male perceptions of ICT self-efficacy. Since computers and ICT become prevalent in everyone's daily lives, similar impression is conveyed by Sam, Othman, & Nordin (2005) on the gender influence on undergraduates' ICT self-efficacy and ICT Anxiety. In supporting, Torkzadeh, Plfughoeft, and Hall (1999) and Torkzadeh, G. and Koufterous, (1994) have reported that there is no significant difference in responses between male and female study participants in a study on computer self-efficacy and training.

The overall significant negative correlation coefficient between ICT self-efficacy and ICT Anxiety was observed and this implied that increase in ICT Anxiety decreases the ICT self-efficacy. Similar findings has been reported by Durndell and Haag, (2002); Hauser, Paul, Bradley, (2012); Hong et al., (2012); Sam, Othman, and Nordin, (2005); Simsek, (2011); Shu, Tu and Wang, (2011); and Zajacova, Lynch, and Espenshade, (2005) and these support the findings of the present study. Therefore, one can conclude that although students[2] have high levels of ICT self-efficacy there is a tendency of subjecting them to a considerably higher anxiety levels when using the libraries' ICT facilities.

Conclusion, Recommendations and implications

Although the respondents' ICT self-efficacy levels were high, ICT Training and additional Library Support are recommended to reduce the ICT Anxiety. However, cross-sectional and longitudinal studies are necessary to generalize the level of ICT Training that students would like to have and the types of library support they have requested.

The current research developed and validated constructs to measure participants' ICT self-efficacy, ICT Anxiety, Library Support, and ICT Training, in order to fill the gap of knowledge regarding efficacy relating to ICT use in the context of Sri Lankan university libraries. The findings of the study pave the way for new researchers to strengthen their findings and to determine how each scale correlates with each factor.

Moreover, this study raises other research questions for future exploration as well. Researchers need to identify additional aspects to improve students' self-efficacy in the future. According to Ren (2000), the positive correlation between training and self-efficacy must be matched with real learning to improve students' self-efficacy and these findings would benefit greatly from additional study.

Considering the constructs that directly and indirectly affect students' ICT self-efficacy, it is important to conduct further in-depth research on the indirect effect of ICT self-efficacy to determine how to improve library's ICT services and awareness. Simultaneously, researchers should identify more student concerns on ICT Anxiety and ICT Training to determine how to provide proper Library Support related to ICT services in the library. Therefore, future researchers should identify each and every potential support and training types that may improve students' ICT self-efficacy, so that effective improvements will be feasible in libraries.

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