

INFORMATION LITERACY COMPETENCIES OF VETERINARY STUDENTS AND THEIR ATTITUDE TOWARDS E-LEARNING

OMER SALIH ELNOOR¹, J.S. HUNDAL^{2*}, NEERAJ KASHYAP³, NIRMAL SINGH⁴ and U.S. CHAHAL²
¹Department of Veterinary and Animal Husbandry Extension Education

²Department of Animal Nutrition, ³Department of Animal Breeding and Genetics, ⁴GADVASU Library
Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana- 141 004, India

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ABSTRACT

A study was conducted to assess the information literacy competencies (ILC) of veterinary students and their attitude towards e-Learning. About 240 undergraduate (UG) and postgraduate (PG) veterinary students were selected randomly and information was collected with the help of a structural questionnaire consisting of 25 items with respect to concept identification, search strategy, document types, search tools, use of results and e-learning. The study revealed that majority of PG students (67.5%) belonged to high knowledge level category whereas majority of UG students (68.3%; $P < 0.01$) possessed low knowledge towards ILC. On an average 6.98 ± 0.19 and 10.35 ± 0.16 responses of UG and PG respondents were found correct which indicated significant ($P < 0.01$) association of education level with ILC among veterinary students. A high percentage of veterinary students lacked the necessary knowledge and skills to identify main concept and significance of words (46.6%), to opt appropriate search strategy (77.9%), to select required document types (36.0%), to utilize efficient search tools (59.6%) and to evaluate and use of results (40.4%). Most of the PG respondents have intermediate ability (80%; $P < 0.01$) to use computer effectively. It was found that video conferencing and audio/video aids were the preferred tools for UG respondents ($P < 0.05$) whereas E-mail and CeRA for PG students ($P < 0.01$) were the preferred tools as far as e-learning was concerned. A significantly higher percentage of PG students believed in e-learning to acquire new knowledge (56.67% vs 29.17%; $P < 0.01$) as compared to UG respondents. As for as e-learning was concerned, most of the respondents (89.17%) have shown favourable attitude towards use of e-learning tools. The findings revealed that there are notable gaps among students towards information literacy competencies and teaching of credit bearing information literacy courses is imperative to enhance students' knowledge and information seeking skills.

Key words: Veterinary students, information literacy competencies, e-learning, education level

Information literacy, an ability to make efficient and effective use of information resources, is being described as a pre-requisite for lifelong learning and has become increasingly significant in teaching and learning. Students with higher level of information literacy demonstrate strong potential for developing critical thinking skills (Allen, 2008) and achieving academic excellence (Nestor, 2006). The effective decision making in health care delivery relies on timely and accurate information (McNeil *et al.*, 2003). Therefore, it becomes important for veterinary students to be equipped with strong information literacy skills as well as e-learning attitude to achieve success in their academic and professional endeavors. But teaching scientific information literacy skills to veterinary students is the missing link. It is noticed that veterinary students are not able to locate and identify relevant information or evaluate its quality. To find the gaps and make appropriate suggestions, the present study was conducted to assess the competency level of information among veterinary students and their attitude towards e-learning.

MATERIALS AND METHODS

Information literacy is a set of abilities requiring individuals to recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information. The present study was conducted in the College of Veterinary Sciences, Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana. A total of 240 veterinary students i.e. 120 undergraduate students (UG; pre-final and final) and 120 postgraduate (PG) were selected for this study. The data pertaining to the objectives of this study was collected on the basis of stratified random sampling technique structural questionnaire. The questionnaire possessed twenty five (25) questions, out of which 19 questions were related to five themes of information literacy competencies i.e. Concept identification, search strategy (knowledge regarding the use of vocabulary tool such as thesaurus and appropriate Boolean operators), Document types (knowing when to refer to a book, journal, newspaper, knowledge about peer review article), search tools (knowing when to use a search engine, meta search engine, database, library catalogue) and use of results

*Corresponding author: drjshundal@yahoo.com

(knowledge to read, evaluate and use of information legally and ethically) whereas six questions were related to e-learning. Each question required information literacy competencies and these competencies became variables in the study. Each variable was represented by one multi choice question. Each correct response was given a score of one. The information related to independent variables like gender and overall credit point average (OCPA) was also collected. The collected data were examined for completeness and correctness before tabulation. The data were analyzed for percentage, mean and standard deviation (Snedecor and Cochran, 1994). On the basis of mean and standard deviation, respondents were categorized into three knowledge categories i.e., Low [total score on knowledge less than (Mean – ½ S.D.)], Moderate [total score on knowledge between (Mean ± ½ S.D.)] and High [total score on knowledge more than (Mean ± ½ S.D.)] (Chandrashekar *et al.*, 1998).

To find level of significance between different independent and dependent variables, Pearson Correlation Coefficient, Chi-square test and ANOVA were employed by using the software package Statistical Analysis Software (SAS, 14.1).

Reliability of Instrument: The questionnaire tool is more reliable than interview, observation and other methods as there is no personal influence of the researchers while data is collected. The questionnaire method was used for data collection to avoid pressure on students for immediate response as they were requested to fill questionnaire and submit at their own convenience. Moreover each theme was represented by proportionate number of multiple choice questions.

Validity: There were around 700 UG and PG students of veterinary science at the university. The data was collected from 240 students (120 UG and 120 PG students) forming nearly 34% of the total population, which was quite representative of the population of veterinary students at the institution.

RESULTS AND DISCUSSION

Information Literacy Competencies of Veterinary Students: Data revealed that 45.52% respondents were able to distinguish between significant/non-significant words whereas 61.25% respondents were able to identify the main concepts in a topic by using the appropriate key words. Ability of PG respondents to distinguish between significant and non-significant words during search process was statistically higher ($P < 0.01$), which may be attributed to the fact that PG students indulge in more information literate activities than UG students. These findings are

in conformity with findings of Anafo (2009) and Dorvlo (2016). Gender had no significant effect as far as responses for significance of words are concerned, however, male respondents had significantly ($P < 0.05$) higher ability to identify the main concepts in a topic by using the appropriate key word as compared to female respondents (65.48% vs 51.39%). These findings are in conformity with findings of Mohammad (2014).

A search strategy is a comprehensive plan for finding information, but study revealed that most of the respondents were unaware about the controlled vocabulary tool namely thesaurus (78.75%), and use of appropriate of Boolean operator 'AND' (70.83%) 'OR' (74.16%) to get more search results. These findings have been supported by many researchers (Diane and Diane, 2003; Ali *et al.*, 2010; Rani, 2011). The PG students exhibited significantly higher ($P < 0.01$) ability towards use of Boolean operator 'OR'. Female respondents were more familiar with the use of Boolean operator 'AND' as compared to male respondents (38.89% vs 10.41%, $P < 0.05$) in search process, indicating significant effect of gender on use of Boolean 'AND'

Selection of document type is a key to get required information and majority of the respondents recognized the usefulness of books (68.33%), journals (60.42%) and newspapers (87.50%) to find required information, whereas only 39.58% respondents possessed knowledge regarding use of peer reviewed to obtain information. About 57.92 and 70% of UG and PG students possessed information literacy competencies (ILC) towards document type. The higher response of PG respondents may be due to the fact that they have to clear a non-credit course on 'Library and Information Services' and they regularly require update information on their subject to design and conduct research trials. On the other hand during graduation most of the students remain limited to their course curriculum only. Gender had no significant association with knowledge level of students towards Document type. The findings are in accordance with findings of Mohammad (2014).

Search tools are the tools used in searching for information and about 47.92, 61.67 and 80% respondents had ability to utilize search tools like database, search engines and library catalogues, respectively to locate required information where as 3.75% and 8.75% of respondents used meta-search engines to find wider information and launching a search in many search engines, respectively. Education level had significant effect on ILC among students as correct responses (%) of PG students were significantly higher ($P < 0.01$) for

Table 1
Response distribution of graduate veterinary students' towards information literacy competencies

Theme	Education level			Gender			Overall n=240
	UG n=120	PG n=120	Chi square	Male n=168	Female n=72	Chi square	
Concept identification							
Differentiating between significant and non-significant terms	43 (35.8)	66 (55.0)	8.891**	80 (47.62)	29 (40.28)	1.096	109 (45.52)
Identifying the main concepts in a topic by using key word	71 (59.2)	76 (63.3)	0.439	110 (65.48)	37 (51.39)	4.214*	147 (61.25)
Overall correct responses for concept identification	57 (47.5)	71 (59.17)	5.333	95 (56.55)	33 (45.84)	1.751	128 (53.34)
Search strategy							
Using a thesaurus to get the preferred vocabulary for a particular database	20 (16.7)	31 (25.8)	3.013	33 (19.64)	18 (25.0)	0.864	51 (21.25)
Using Boolean operator 'AND' function	35 (29.2)	35 (29.2)	0.000	42 (10.41)	28 (38.89)	4.706*	70 (29.17)
Using Boolean operator 'OR' function	6 (5.0)	32 (26.7)	21.136**	24 (14.28)	14 (19.45)	1.006	38 (15.84)
Overall correct responses for search strategy	20.34 (16.95)	32.67 (27.23)	3.632	33 (19.64)	20 (27.78)	1.456	53 (22.08)
Document types							
Knowing when to refer to a book	80 (66.7)	84 (70)	0.308	111 (66.07)	53 (73.61)	1.342	164 (68.33)
Knowing when to refer to a journal	55 (45.8)	90 (75)	21.343**	98 (58.34)	47 (65.28)	1.016	145 (60.42)
Knowing when to refer to a newspaper	101 (84.2)	109 (90.8)	2.438	145 (86.31)	65 (90.28)	0.726	210 (87.50)
Knowing which is a peer reviewed article	42 (35)	53 (44.2)	2.108	70 (41.67)	25 (34.73)	1.016	95 (39.58)
Overall correct responses for document types	69.5 (57.92)	84 (70.0)	3.086	106 (63.10)	47.5 (65.97)	0.348	153.5 (63.96)
Search tools							
Knowing when to use a database	29 (24.2)	86 (71.7)	54.244**	76 (45.24)	39 (54.17)	1.609	115 (47.92)
Knowing when to use a search engine such as Google	63 (52.5)	85 (70.8)	8.531**	98 (58.34)	50 (69.45)	2.632	148 (61.67)
Knowing when to use a meta search engine such as Copernic	2 (1.7)	7 (5.8)	2.886	7 (4.17)	2 (2.78)	0.269	9 (3.75)
Knowing how to launch a search in many search engines simultaneously	13 (10.8)	8 (6.7)	1.305	15 (8.92)	6 (8.34)	0.022	21 (8.75)
Knowing how to use a library catalogue	86 (71.7)	106 (88.3)	10.417	134 (79.76)	58 (80.56)	0.019	192 (80.0)
Overall correct responses for search tools	38.6 (32.17)	58.4 (48.67)	9.232	66 (39.29)	31 (43.06)	0.986	97 (40.42)
Use of results							
Reading citation	13 (10.8)	90 (75.0)	2.718**	67 (39.88)	37 (51.39)	2.718	104 (43.34)
Recognizing the type of document that corresponds to a bibliographic reference	22 (18.3)	57 (47.5)	23.115*	56 (33.34)	23 (31.95)	0.044	79 (32.92)
Knowing the criteria used in evaluating the quality of a web site	41 (34.1)	60 (50.0)	6.171*	69 (41.07)	32 (44.45)	0.235	101 (42.08)
Knowing why to include a reference	16 (13.3)	55 (45.8)	31.746**	51 (30.36)	21 (29.17)	0.034	72 (30.0)
Ethical use of information	100 (83.3)	109 (90.8)	3.809	110 (65.48)	37 (51.39)	0.181	210 (87.5)
Overall correct responses for Use of Results	38.6 (32.17)	58.4 (48.67)	2.001*	70.6 (42.02)	30 (41.67)	0.012	97 (40.42)

Figures in parenthesis indicate percentage; UG=Undergraduate; PG=Postgraduate;

**Significant at 0.01 level; *Significant at 0.05 level

knowledge about most efficient search tools (24.2% vs 71.7%), recognition of type of information that can be located through search engines (25.5% vs 70.8%) and regarding the use of library catalogue (71.7% vs 88.3%) as compared to UG students, since the post graduate students frequently use information sources. It was found that gender has no significant effect on ILC of the students towards knowledge about search tools. These findings are in conformity with the findings of Whitmire (2001).

As for as use of results is concerned, 59.52% respondents lacked knowledge to read, evaluate and use information legally and ethically, indicating that the

respondents would not be able to gauge the relevance and currency of a reference, subsequently unable to select the best way to search for information and may commit plagiarism without realizing it. These findings are in conformity with findings of other researchers (Diane and Diane, 2003; Ali *et al.*, 2010; Rani, 2011; Siu *et al.*, 2014). Education had significant association with ILC as PG respondents had significantly higher (48.67%; $P < 0.05$) knowledge about ILC towards 'Use of Results' as compared to UG respondents (32.17%).

Relationship between Overall Credit Point Average (OCPA) of Students and ILC: The data as per Table

3 revealed that there was a positive and significant relationship between OCPA and correct responses for search strategy, document types, search tools and use of results which might be due to the reason that the students with high score access more information sources for better understanding of the subject, to clear their doubts and to get more marks (OCPA). These findings are in conformity with findings of Mohammad (2014).

Knowledge Level of Students Towards ILC: The extent of knowledge of students towards ILC (Table 2) on the basis of mean (8.67) and standard deviation (2.55) indicated that 37.5% of the respondents belonged to low, 22.5% to moderate and 40.0% to high level knowledge categories. Education level had significant effect on knowledge level of respondents as 67.5% of PG students possessed high knowledge level ($P<0.01$) as compared to 12.5% in UG students towards ILC. It might be due to the reason that PG students indulge in more information literate activities like designing research trials, preparing class assignments etc. than undergraduate students.

Attitude of Students Towards Information Literacy and e-learning: The response distribution regarding attitude of students towards information literacy and e-learning is given in Table 4. Majority of the respondents (82.09%) considered information literacy as very significant or significant tool for lifelong learning. With regard to usage of computers about 72.5% respondents had intermediate ability to use computer, however, only 19.58% respondents possessed higher (Expert/advanced) skills to use computer effectively. A higher percentage ($P<0.01$) of the PG respondents had intermediate ability (80%) to use computer effectively as compared to 65% in UG respondents, which might be due to the reason that PG students regularly use computers to find latest information on their subject and to complete assigned work.

The percentages of veterinary students using video conferencing, electronic mail, search engines, audio/video aids, CD-ROM/Online databases and Consortium for e-

Resources in Agriculture (CeRA) as e-learning tools were 3.34%, 38.34%, 62.92%, 25.84%, 8.75% and 31.25%, respectively. The higher use of search engines as e-learning tool by the veterinary students indicated the popularity of internet among them, as they were addicted to it to retrieve required information on the subjects of their interest. It was found that video conferencing and audio/video aids were the preferred tools for UG respondents ($P<0.05$) whereas e-mail and CeRA were the preferred tools for PG students. A significant higher percentage of PG students believed in e-learning to acquire new knowledge (56.67% vs 29.17%; $P<0.01$), enjoyed use of information communication technologies for their studies (40.84% vs 25.84%; $P<0.05$) and convinced with ease of getting information through e-learning (26.67% vs 15.84%; $P<0.05$) as compared to UG respondents. These results are in accordance with findings of Hussain (2007). For academic purpose, PG respondents opined that it would be useful to download and access online audio/visual recordings of lectures (65%; $P<0.05$) and communicate through social networking sites with fellow students (35.84%; $P<0.01$) whereas UG students considered that mobile phones were beneficial to access web-based information (34.17%; $P<0.01$). As for as e-learning is concerned, most of the UG (89.17%) and PG respondents (89.17%) have shown favourable attitude towards use of e-learning tools. The differences were statistically significant, indicating the effect of education on attitude of veterinary students towards e-learning. These findings are in conformity with the findings of Nassoura (2012) who revealed that many students had positive attitudes towards e-learning because it had a positive impact on their motivation as well as self-esteem. Gender had no significant effect on attitude of veterinary students towards e-learning except significance of information literacy for lifelong learning, use of CeRA as e-learning tool and to enjoy use of information technology communication in which responses were statistically different for both the sexes.

Table 2
Knowledge level of veterinary students towards information literacy competencies

Knowledge level	Education level		Overall Knowledge Level N=240
	UG	PG	
	n=120	n=120	
Low (upto 7.393 score)	82 ^b (68.3)	8 ^a (6.7)	90 (37.5)
Moderate (7.394 to 9.946 score)	23 ^a (19.2)	31 ^a (25.8)	54 (22.5)
High (=9.947 score)	15 ^a (12.5)	81 ^b (67.5)	96 (40)

Figures in parenthesis indicate percentage

Figures (for education level) with different superscript in a row differ significantly, $P<0.01$

Table 3
Relationship between overall credit point average (OCPA) and information literacy competencies of veterinary students

Correct responses for Information literacy competencies	UG 'r' value	PG 'r' value	Overall responses 'r' value
Concept Identification	0.066	0.77	0.078
Search Strategy	0.036	0.100	0.225**
Document Types	0.095	0.126	0.254**
Search Tools	0.151	0.038	0.327**
Use of Results	0.116	0.121	0.439**
Overall correct responses	0.057	0.056	0.501**

**Significant at the 0.01 level; *Significant at the 0.05 level

Table 4
Response distribution regarding attitude of veterinary students towards information literacy and e-learning

Skill orientation towards e-learning	Education level			Gender			Overall n=240
	UG n=120	PG n=120	Chi square	Male n=168	Female n=72	Chi square	
Do you think that Information Literacy is significant for lifelong learning?							
Very significant	50 (41.67)	50 (41.67)	0.000	77 (45.84)	23 (31.95)	4.000*	100 (41.67)
Significant	49 (40.84)	48 (40.0)	0.017	63 (37.5)	34 (47.23)	1.970	97 (40.42)
Somewhat significant	12 (10.0)	15 (12.5)	0.376	17 (10.12)	10 (13.89)	0.717	27 (11.25)
Not significant	3 (2.5)	1 (0.84)	1.017	3 (1.79)	1 (1.39)	0.048	4 (1.67)
I do not know	6 (5.0)	6 (5.0)	0.000	8 (4.76)	4 (5.56)	0.067	12 (5)
Indicate your ability to use computer							
Unskilled	2 (1.67)	2 (1.67)	0.000	3 (1.79)	1 (1.39)	0.048	4 (1.67)
Beginner	12 (10.0)	3 (2.5)	5.760*	12 (7.14)	3 (4.17)	0.762	15 (6.25)
Intermediate	78 (65.0)	96 (80)	6.770**	118 (70.24)	56 (77.78)	1.437	174 (72.5)
Expert	22 (18.34)	13 (10.84)	2.709	25 (14.88)	10 (13.89)	0.039	35 (14.58)
Advanced	6 (5.0)	6 (5.0)	0.000	10 (5.95)	2 (2.78)	1.069	12 (5)
Which of the following e-learning tools do you use?							
Video conferencing	7 (5.84)	1 (0.84)	4.655*	6 (3.57)	2 (2.78)	0.098	8 (3.34)
Electronic mail (E-mail)	28 (23.34)	64 (53.34)	22.843**	60 (35.71)	32 (44.45)	1.625	92 (38.34)
Search engines	75 (62.5)	76 (63.34)	0.018	104 (61.90)	47 (65.28)	0.246	151 (62.92)
Audio/Video aids	42 (35.0)	20 (16.67)	10.520**	46 (27.38)	16 (22.23)	0.700	62 (25.84)
CD-ROM/ Online databases	10 (8.34)	11 (9.17)	0.0522	15 (8.93)	6 (8.34)	0.022	21 (8.75)
CeRA	2 (1.67)	73 (60.83)	97.765**	43 (25.60)	32 (44.45)	8.335*	75 (31.25)
Please indicate your agreement with the following statements							
I enjoy using Information Communication Technologies for my studies	31 (25.84)	49 (40.84)	6.075*	47 (27.98)	33 (45.84)	7.232**	80 (33.34)
I believe e-learning gives opportunities to acquire new knowledge	35 (29.17)	68 (56.67)	18.520**	67 (39.88)	36 (50.0)	2.107	103 (42.92)
I believe e-learning enhances my learning experience	36 (30.0)	38 (31.67)	0.078	49 (29.17)	25 (34.73)	0.729	74 (30.84)
I feel that convenience is an important feature of e-learning	19 (15.84)	32 (26.67)	4.208*	32 (19.05)	19 (26.39)	1.623	51 (21.25)
In your studies, do you think that it would be useful to							
Download and access online audio/visual recordings of lectures	61 (50.84)	78 (65.0)	4.940*	92 (54.76)	47 (65.28)	2.287	139 (57.92)
Use mobile phones to access web-based information services of university	41 (34.17)	21 (17.5)	8.699**	48 (28.57)	14 (19.45)	2.191	62 (25.87)
To contribute with other students to develop wiki related to your course	9 (7.5)	5 (4.17)	1.213	12 (7.14)	2 (2.78)	1.748	14 (5.84)
To receive pre-class discussion questions from teachers via text-message	12 (10.0)	14 (11.67)	0.173	18 (10.71)	8 (11.12)	0.008	26 (10.84)
Use social networking sites to communicate with other students for academic purposes	22 (18.34)	43 (35.84)	9.305**	45 (26.79)	20 (27.78)	0.0251	65 (27.08)
Please indicate your attitude towards e-learning							
I dislike the idea of using e-learning tools	2 (1.67)	4(3.34)	0.684	4 (2.38)	2 (2.78)	0.033	6 (2.5)
I have a favourable attitude towards using e-learning tools	106 (88.34)	108 (90.0)	0.173	147 (87.5)	67 (93.06)	1.610	214 (89.17)
Can't say	12 (10.0)	8 (6.67)	0.873	17 (10.12)	3 (4.17)	2.338	20 (8.34)

Figures in parenthesis indicate percentage; UG=Undergraduate; PG=Postgraduate;
**Significant at 0.01 level; *Significant at 0.05 level

In conclusion, a high percentage of veterinary students lacked the necessary knowledge and skills to identify the concept, strategy to perform search, selection of document types, and efficient utilization of search tools to evaluate and use information legally and ethically. Postgraduate students had higher knowledge as compared to undergraduate veterinary students which indicates the

effect of education level on Information Literacy competencies. Students with high score (OCPA) also possessed more knowledge. Hence, knowledge level of veterinary students and their skills on identifying, interpreting, evaluating and accessing information needs to be developed and enhanced.

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