Citation Analysis of Veterinary Dissertations

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Abstract

The author sought to understand the pattern of use of information resources by the university undergraduates in the Veterinary Medicine and Animal Sciences discipline. This study analyzed 6754 citations from 361 undergraduate dissertations from 2014-2018 submitted to the Faculty of Veterinary Medicine and Animal Sciences, University of Peradeniya, Sri Lanka. According to the findings journals were appeared to be the most preferred source of citation among the Veterinary Medical students. Data sets conformed to the Leimkuhler model derived from Bradford’s law. In the ranked list of core journals in Veterinary science, *Journal of dairy science* took the first place with 108 citations. Further, results indicated that the students utilized current information mostly for their research. Further observation on authorship patterns of the journal citations indicated that the students of selected veterinary dissertations had mostly cited journal articles which have been authored in collaboration. Recommendations were drawn towards improving the library collection in a user-centric manner and strengthening library instruction. The study contributes to the realm of library literature where

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research that focuses on citation analysis of Veterinary dissertations which is in scarce.

Keywords: Bradford’s law, Citation, Dissertations, Veterinary, Undergraduates
Introduction

University undergraduates are the main user category to which the university library should cater adequately. The university library collection is the predominant information hub which the undergraduates utilize to meet their information needs. So, it is imperative that the library collection should be developed in a user-centric manner. Librarians should be conscious of changing user demands and design dynamic polices for collection development. Analyzing citations in students’ dissertations is a popular and effective way to examine whether the library is in alignment with the user demands (Gunasekera, 2013).

Alan Pritchard first coined the term “Bibliometrics” in 1969 to define “the application of mathematics and statistical methods of books and other media of communication” (Pritchard, 1969, p.349). Citation analysis, a branch of bibliometrics, “measures the utility of documents and relationship between their author and their documents” (Banateppanvar et al., 2013, p.147). This technique helps assess scholarly output, detect significant journals in a discipline, trace research traits and also provides the baseline to form scientific indicators (Zafrunnisha, 2012). It is important that citation studies are conducted consistently and periodically in order to identify numerous developments and changes incorporated into scholarly output with time.

Librarians must recognize their users’ information needs. Citation analysis is a powerful tool that helps librarians to make innovative and user-centric collection development decisions to design and enhance user services. Analyzing publications or dissertations submitted to a certain institute is a common approach of citation analysis. Nabe and Imre (2008, para 4) highlight that “dissertations clearly indicate the needs of
graduate students, and also indicate the research specialties of the faculty and departments as a whole”.

In the development of library collections, documents which are mostly cited are the most significant ones to be included into the library collection (Sudhier, 2010). Also, since journals are of vital importance for research purposes, identifying most and least referred journals is salient in making subscription and cancellation decisions. The highly cited journals, which are “core journals”, a notion evolved from the Bradford’s law of scattering, “always contain a higher concentration of relevant articles in a particular discipline” (Sudier, 2010, p.3). Citation analysis supports librarians to make effective collection development decisions against financial and space constraints. Moreover, insights into citation patterns would inform decision makers on library instruction and student outreach programs (Wilson, 2012).

The Faculty of Veterinary Medicine and Animal Sciences (FVMAS), University of Peradeniya, Sri Lanka is the only faculty in the discipline of Veterinary Medical Science in Sri Lanka. In the FVMAS it is compulsory for final year undergraduates to carry out a research project and submit a report for their graduation. Copies of these dissertations are deposited at their faculty library, which is also the only Sri Lankan university library catering for users in the Veterinary discipline. The overall objective of the current study is to analyze the citations in undergraduate dissertations to ascertain whether the library is adequately satisfying research needs of the Veterinary medical undergraduates. This study is guided by the following specific objectives:

• To detect the most preferred types of publications cited by the student sample
• To demonstrate Bradford’s law of scattering
• To compile a ranked list of core journals in the Veterinary Medicine field
• To trace the chronological distribution of cited material
• To examine the authorship patterns of the cited journal articles

**Literature Review**

Various researchers have applied citation analysis as a powerful tool for improving library collections in different disciplines. Barnett-Ellis and Tang (2016) attempted to develop a user-centric library collection by analyzing 2351 citations appended to 40 Masters’ biology theses. Journals were appeared to be the most cited document accounting for 75% citations. Similarly, Trigar et al. (2013) analyzed the theses of Dental and Medical science graduates and found that journals were the most popular among the citations. Similar results were obtained by Becker and Chiware (2015) in their examination on of Master and doctoral dissertations in the Engineering discipline. Findings revealed that journals were the most utilized resource by the students. The authors concluded that citation analysis together with other methods is one of the most powerful tools to evaluate whether the library collection is adequately satisfying students’ research demands.

In line with the above studies, Fasae (2012), Banatepanvar et al. (2013), Sinha and Singha (2016), Griffin (2016) and Salami and Olatokun (2018) have analyzed citations appended to Masters/PhD theses in diverse disciplines and identified that journals were the most dominant type of citation format among scholars.
However, different results were reported by Mahajan and Kumar (2017). The authors examined citations from PhD dissertations in the History discipline and identified that books were the most frequently used resource by History researchers. In the same way, Rozenburg (2015) also observed that books were the most preferred document of reference in his study of graduate theses in Sociology and Anthropology.

Wilson (2012) examined 2301 citations appended to 88 undergraduate honors theses submitted to the University of South Alabama, Library. It was revealed that books and journals were more popular among students in all disciplines except Social Sciences, in which news-papers were heavily cited by the students. In a related study, Gadd et al. (2010) analyzed final-year projects of MEng Civil Engineering students and BSc Construction Engineering Management (CEM) students. Overall, the students had cited books (27.5%) more frequently, followed by journals (24.8%). Furthermore, journals were highly cited by the MEng students in comparison with CEM students.

Kohn and Gordon (2014) perused bibliographies of undergraduate theses from three departments: Sociology, Psychology and International studies. The authors found that journals were the most popular source of citation and that more than 70% of these cited journals were accessible through the Library. Thus, it was shown that the undergraduates were more likely to cite what was available in their institution.

Oliveira (1984) conducted a study in the domain of Veterinary Medicine and Animal Science, in Brazil to trace out the citation trend in Veterinary medicine discipline using Masters Dissertations. Periodicals, which accounted for 70% of total citations, was found to be the most preferred information source consulted by the researchers. The Journal of
American Veterinary Medicine Association topped the ranked list of journals. However, the data sets of the study did not satisfy the Bradford’s law. Corroborating the above results, Olatokun and Makinde (2009) also found that students mostly cited journals in their study of Masters dissertations submitted to the Department of Animal Science in a Nigerian University. Further, the findings had implications for “both collection development and user service design in libraries” (Olatokun & Makinde, 2009, p.117).

Pelzer and Wiese (2003) analyzed bibliographic citations appended to twelve core Veterinary journals and observed that 6.38% of citations were grey literature. Also, they found that conferences played a crucial role accounting for 50.1% of the grey literature. It was concluded that the prevalence of grey literature was lower in Veterinary scholarly communications. In another study, Crawley-Low (2006) compiled a list of significant journals in the Veterinary Medical discipline by analyzing citations appeared in the American Journal of Veterinary Research. It was also revealed that Veterinary Medical researchers mostly cited journals.

The literature amply demonstrates evidence of using citation analysis spanning dissertations across various disciplines. However, there is a dearth of studies that examine dissertations for developing the collection in a Veterinary Library. Thus, this study will contribute to fill this gap in literature while extending the sphere of knowledge in the realm of citation analysis within the Veterinary Medicine discipline.
Methodology

The study analyzed 361 dissertations submitted by undergraduates to the FVMAS, University of Peradeniya, Sri Lanka during the time span of 2014-2018. Reference lists of each dissertation were closely examined and relevant information such as publication type, year, authorship, journal name (for journal citations) was tabulated in alignment with the study objectives using MS Excel sheets. The citations were categorized into seven broad categories as follows: Books, Journals, Dissertations, Proceedings, Web (Internet) resources, Reports (i.e. annual reports and technical reports) and Miscellaneous (i.e. handbooks, newspapers, standards, magazines and course material).

A total of 6754 citations appended in the 361 dissertations formed the basis for this study and the citations were quantitatively analyzed using descriptive statistics. Journal citations were compiled separately according to their descending order of frequency. Bradford’s law of scattering was employed to identify significant journals.

Applying the Bradford’s law

The Bradford’s law is a powerful bibliometric tool that is extensively applied in determining the productivity of journals (Sudhier, 2010). This law outlines the quantitative relationship among journals and the articles contained in them. Journals are compiled in descending order of productivity of articles based on citations of a given subject and divided into three approximately equal zones. Bradford defined the first zone as the “nuclear zone”, the second zone as moderately productive and the third zone as the low productive zone (Bardford, 1950;
The “nuclear zone” which accounts for a small number of core journals, is highly productive (Weerasinghe, 2017). Bradford had expressed his law as:

[... ] if scientific journals are arranged in the order of decreasing productivity of articles on a given subject, they may be divided into a nucleus of periodicals more particularly devoted to the subject and several groups or zones containing the same number of articles as the nucleus, where the numbers of periodicals in the nucleus and succeeding zones will be as 1: n: n² [... ] (Bradford, 1950, p. 116). Here ‘n’ is a multiplier.

Several researchers formulated mathematical models based on Bradford’s Law to better explain the phenomenon of scattering. Leimkuhler (1980) introduced a model based on Bradford’s verbal formulation (Weerasinghe, 2017):

\[ R(r) = a \log (1 + br) ; \quad r=1,2,3, \ldots \]

Where \( R(r) \) is the cumulative number of items produced by sources of rank 1,2,3, ..., \( r \).

\( a \) and \( b \) are constants appearing in the Leimkuhler’s law (Weerasinghe, 2017). This can be applied to compute the number of articles in a journal at a certain rank.

While describing Leimkuhler’s law, Egghe (1986, 1990a, 1990b) verified:

\[ a = Y_o / \log k \quad \text{and} \quad b = (k - 1) / r_o \]

Where \( r_o \) is the number of sources in the first Bradford’s group, \( Y_o \) is the number of items in every Bradford group and \( k \) is the Bradford multiplier.
Egghe (1986) derived a mathematical formula to compute k, attributing to the fact that when journals are ranked according to their decreasing order of productivity, \( Y_m \) will be the number of articles in the rank one journal.

\( p \) is the number of groups and a parameter which can be selected freely when creating Bradford groups.

After \( p \) and \( Y_m \) are found, \( k \) can be computed using:

\[
k = \left( e^\gamma Y_m \right)^{1/p}
\]

Here \( \gamma \) is Euler’s number \( \gamma = 0.5772 \) and \( e^\gamma \approx 1.781 \)

Then, \( k = (1.781 Y_m)^{1/p} \) ………….(x)

Whereas \( Y_o = Y_m^2 \log k \) and

\( r_o = (k - 1)Y_m \)

Egghe (1990a, 1990b) has shown that:

\( Y_o = A/p, \) where \( A \) is the total number of articles in the bibliography.

If \( T \) is the total number of journals, in the \( i^{th} \) Bradford group, there are \( r_0k^{i-1} \) journals (\( i = 1, 2, 3, \ldots p \)) (Weerasinghe, 2017).

Thus,

\[
T = r_0 + r_0k + r_0k^2 + \ldots + r_0k^{p-1}
\]

So, \( r_o = T / (1 + k + k^2 + \ldots + k^{r-1}) = T (k - 1) / (k^p - 1) \)

\( A \) and \( T \) can be derived from raw data. \( r_o \) and \( Y_o \) are found after \( k \) is computed using the formula (x), i.e. \( k = (1.781 Y_m)^{1/p} \)

**Results and Discussion**

In the current study 6754 citations were identified from the 361 undergraduate dissertations submitted to the FVMAS over the time period of 2014-2018. The total number of dissertations and the citations appended to those according to the submitted year are illustrated by Table 1. The maximum number of dissertations, 78 (21.61%) containing the
maximum number of citations, 1665 (24.65%) had been submitted in the year 2017.

Table 1

Distribution of the dissertations and their citations according to the year of submission

| Year | No. of dissertations | (%) Dissertations | Number of citations | (%) Citations |
|------|----------------------|-------------------|---------------------|---------------|
| 2018 | 77                   | 21.33             | 1617                | 23.94         |
| 2017 | 78                   | 21.61             | 1665                | 24.65         |
| 2016 | 75                   | 20.78             | 1161                | 17.19         |
| 2015 | 69                   | 19.11             | 1177                | 17.43         |
| 2014 | 62                   | 17.17             | 1134                | 16.79         |
| Total| 361                  | 100.00            | 6754                | 100.00        |

Figure 1 depicts the distribution of cited materials by their format. It is evident from Figure 1 that journals the most popular citation format (63.64%) among Veterinary Medical students conforming to prior related studies such as Oliveira (1984); Olatokun and Makinde (2009). Furthermore, Books are the second highest percentage of citations (13.07%), followed by citations from miscellaneous items (8.65%) and web citations (7.86%).
Applying the Bradford’s law

The total number of journal citations (4298) was divided into three approximately equal zones. 61 journals contained 1468 citations while the next 287 journals contained 1367 citations and the next 1231 journals covered 1463 citations respectively. Conforming to Bradford zones, the relationship between each zone is 61:287:1231. The data set does not comply with the Bradford’s distribution (Tables 2 and 3).

Thus, the model formulated by Leimkuhler was applied to prove the Bradford’s law.

Number of groups p=3 and the number of articles in the most productive source $Y_m=108$.

Bradford multiplier $k$, $k = (e^\gamma Y_m)^{1/p}$

$k = (1.781 \times 108)^{1/3} = 5.77$

The number of items in every Bradford group ($Y_o$), $Y_o = \frac{A}{p} = \frac{4298}{3} = 1433$
Table 2

Distribution of Journals

| Rank | Number of journals | Cumulative number of journals (n) | Number of citations | Total number of citations | Cumulative number of citations | log(n) | % Cumulative Citations |
|------|--------------------|----------------------------------|---------------------|--------------------------|--------------------------------|--------|------------------------|
| 1    | 1                  | 1                                | 108                 | 108                      | 108                            | 0      | 2.51279665             |
| 2    | 1                  | 2                                | 66                  | 66                       | 174                            | 0.693147 | 4.0483946             |
| 3    | 1                  | 3                                | 59                  | 59                       | 233                            | 1.098612 | 5.42112611            |
| 4    | 1                  | 4                                | 45                  | 45                       | 278                            | 1.386294 | 6.46812471            |
| 5    | 1                  | 5                                | 43                  | 43                       | 321                            | 1.609438 | 7.46859004            |
| 6    | 1                  | 6                                | 37                  | 37                       | 358                            | 1.791759 | 8.32945556            |
| 7    | 2                  | 8                                | 36                  | 72                       | 430                            | 2.079442 | 10.0046533            |
| 8    | 3                  | 11                               | 35                  | 105                      | 535                            | 2.397895 | 12.4476501            |
| 9    | 1                  | 12                               | 33                  | 33                       | 568                            | 2.484507 | 13.215449             |
| 10   | 2                  | 14                               | 32                  | 64                       | 632                            | 2.639057 | 14.7051377            |
| 11   | 1                  | 15                               | 31                  | 31                       | 663                            | 2.70805  | 15.4257794            |
| 12   | 2                  | 17                               | 27                  | 54                       | 717                            | 2.833213 | 16.6821778            |
| 13   | 3                  | 20                               | 26                  | 78                       | 795                            | 2.99573  | 18.4969753            |
| 14   | 1                  | 21                               | 25                  | 25                       | 820                            | 3.04522  | 19.0786412            |
| 15   | 1                  | 22                               | 23                  | 23                       | 843                            | 3.091042 | 19.6137738            |
| 16   | 2                  | 24                               | 22                  | 44                       | 887                            | 3.178054 | 20.6375058            |
| 17   | 1                  | 25                               | 20                  | 20                       | 907                            | 3.218876 | 21.1028385            |
| 18   | 3                  | 28                               | 19                  | 57                       | 964                            | 3.332205 | 22.4290368            |
| 19   | 3                  | 31                               | 18                  | 54                       | 1018                           | 3.439387 | 23.6854351            |
| 20   | 5                  | 36                               | 17                  | 85                       | 1103                           | 3.583519 | 25.6630991            |
| 21   | 9                  | 45                               | 16                  | 144                      | 1247                           | 3.806662 | 29.0134946            |
| 22   | 5                  | 50                               | 15                  | 75                       | 1322                           | 3.91203  | 30.7584923            |
| 23   | 3                  | 53                               | 14                  | 42                       | 1364                           | 3.970292 | 31.735691            |
| 24   | 8                  | 61                               | 13                  | 104                      | 1468                           | 4.110874 | 34.1554211            |
| 25   | 3                  | 64                               | 12                  | 36                       | 1504                           | 4.158883 | 34.99302              |
| 26   | 3                  | 67                               | 11                  | 33                       | 1537                           | 4.204693 | 35.760819            |
| 27   | 8                  | 75                               | 10                  | 80                       | 1617                           | 4.317488 | 37.6221498            |
| 28   | 11                 | 86                               | 9                   | 99                       | 1716                           | 4.454347 | 39.9255468            |
| 29   | 16                 | 102                              | 8                   | 128                      | 1844                           | 4.624973 | 42.903671            |
| 30   | 12                 | 114                              | 7                   | 84                       | 1928                           | 4.736198 | 44.8580735            |
| 31   | 18                 | 132                              | 6                   | 108                      | 2036                           | 4.882802 | 47.3708702            |
| 32   | 46                 | 178                              | 5                   | 230                      | 2266                           | 5.181784 | 52.7221964            |
| 33   | 59                 | 237                              | 4                   | 236                      | 2502                           | 5.46806  | 58.2131224            |
| 34   | 111                | 348                              | 3                   | 333                      | 2835                           | 5.852202 | 65.9609121            |
| 35   | 232                | 580                              | 2                   | 464                      | 3299                           | 6.363028 | 76.756631             |
| 36   | 999                | 1579                             | 1                   | 999                      | 4298                           | 7.364547 | 100                   |
Table 3

The distribution of journals and citations across Bradford’s zones

| Zone | Number of journals | Number of citations | % Journals | % Citations |
|------|--------------------|---------------------|------------|-------------|
| 1    | 61                 | 1468                | 3.863      | 34.155      |
| 2    | 287                | 1367                | 18.176     | 31.806      |
| 3    | 1231               | 1463                | 77.961     | 34.039      |
| Total| 1579               | 4298                | 100        | 100         |

Number of journals in the first Bradford group \( r_o \):

\[
 r_o = T(k - 1)/(k^p - 1) = 1579 (5.77 - 1)/(5.77^3 - 1) = 39.4 
\]

Here, \( T=1579 \)

Therefore Bradford’s distribution:

\[
39.4:39.4(5.77):39.4(5.77^2) = 39.4:227.34:1311.74 
\]

Percentage error = \( {(1579-(39.4+227.34+1311.74))/1579}*100\% = 0.03\%

The percentage error (0.03%) is negligible. This indicates that the data fits well with the Leimkuhler model derived from the Bradford’s law. Thus, in the first zone 39 journals, i.e., the core journals (2.47%) covered 1151 citations (26.78 %), the next 228 journals (14.439%) covered 1441 citations (33.527 %) whereas the next 1312 journals (83.091%) spanned 1706 citations respectively (39.693 per cent) (Table 4). Figure 2 illustrates the Bradford plot for journal distribution which confirms the verbal formulation that detects specific regularity in the organization of scholarly work (Sudhier, 2010). This indicates that only a small numbers of journals are highly cited by students.
Table 4

The distribution of journals and citations according to Leimkuhler model

| Zone | Number of journals | Number of citations | % Journals | % Citations |
|------|--------------------|---------------------|------------|-------------|
| 1    | 39                 | 1151                | 2.470      | 26.780      |
| 2    | 228                | 1441                | 14.439     | 33.527      |
| 3    | 1312               | 1706                | 83.091     | 39.693      |
| Total| 1579               | 4298                | 100        | 100         |

Figure 2

Bradford plot for journal distribution

The results indicate that the nuclear zone consists of 39 highly cited journals (core journals) by the veterinary medical students. Table 5 exhibits the ranked list of core journals. *Journal of dairy science*, with 108 citations, topped the ranked list while *Poultry science* secured the
second place with 66 citations followed by the *Journal of clinical microbiology* and *Veterinary Parasitology*.

**Table 5**

*Journals in Bradford zone 1-Ranked list of core journals*

| Name of the Journal                                                                 | Rank |
|------------------------------------------------------------------------------------|------|
| Journal of dairy science                                                          | 1    |
| Poultry Science                                                                   | 2    |
| Journal of clinical microbiology                                                   | 3    |
| Veterinary parasitology                                                            | 4    |
| Applied and environmental microbiology                                            | 5    |
| Veterinary microbiology                                                            | 6    |
| Plos one                                                                          | 7    |
| Theriogenology                                                                    | 7    |
| Emerging infectious diseases                                                      | 8    |
| Journal of the American veterinary medical association                            | 8    |
| Veterinary record                                                                 | 8    |
| Tropical agricultural research                                                     | 9    |
| Journal of antimicrobial chemotherapy                                             | 10   |
| Sri Lanka veterinary journal                                                      | 10   |
| Journal of reproduction and fertility                                             | 11   |
| Avian pathology                                                                   | 12   |
| Zoo biology                                                                       | 12   |
| Avian diseases                                                                     | 13   |
| Clinical microbiology reviews                                                     | 13   |
| Revue scientifique et technique international office of epizootics                 | 13   |
| Journal of veterinary medical science                                             | 14   |
| Clinical infectious diseases                                                      | 15   |
| American journal of veterinary research                                           | 16   |
| Journal of animal science                                                         | 16   |
| Canadian veterinary journal                                                       | 17   |
| Applied animal behavior science                                                    | 18   |
| Veterinary clinics of North America: Small animal practice                         | 18   |
Table 6 exhibits the number of citations covering the period from 1950 to 2018. For convenience, the overall citations were divided into 8 classes, each spanning a 10 year time period up to 2010, followed by 8 year period afterwards (i.e. 2011 to 2018). The chronological distribution of cited materials outlines the currentness of scholarly work utilized by researchers while demonstrating the growth of a discipline with respect to research output (Banateppanavar et al., 2013; Yeap and Kiran, 2017). Table 6 indicates that Veterinary Medical students had mostly cited material published over the time period of 2001-2010 followed by material published in 2011-2018. This result clearly indicates the necessity off or recent information among undergraduates in the field of Veterinary Medicine and Animal Science in satisfying their research desires.
Authorship Patterns of Cited Documents

Analyzing the authorship patterns is a salient attribute of citation analysis. In the current study, the journal citations were selected to determine the authorship pattern. Results revealed that most of the journal citations (62.471%) were by three authors, 19.148% of them were by two authors while 17.799% of citations were by a single author (Table 7). Table 7 shows that the majority of citations (81.619%) were by multi-authors (two or more). This indicates that the journal articles cited by Veterinary medical undergraduates have mostly been written by multiple authors.
Table 7

Authorship patterns of journal citations

| Authors     | Citations | % Citations |
|-------------|-----------|-------------|
| 1           | 765       | 17.799      |
| 2           | 823       | 19.148      |
| 3           | 2685      | 62.471      |
| 4           | 10        | 0.233       |
| Institutions| 5         | 0.116       |
| No author   | 10        | 0.233       |
| **Total**   | **4298**  | **100**     |

Conclusion

This study indicated that journals were the most frequently used information resource by Veterinary Medical undergraduates in fulfilling their research purposes. Data sets were in accordance with the Leimkuhler model derived from Bradford’s law. Thus, 39 journals were identified as core journals whereas *Journal of dairy science* topped the ranked list. Based on the findings, indicators can be developed in support of the Veterinary library collection development (Weerasinghe, 2017). The library management can use the “core journals” which are significant and of greater productivity to incorporate into the collection. Subscription priority can be given to these significant journals. Several core journals (e.g. *Journal of dairy science*, *Poultry science*, *Veterinary parasitology*, *Veterinary microbiology and Theriogenology*) which are published by Elsevier could be accessed via the Science Direct database. Thus, it is recommended to subscribe the Science Direct database to enhance the access to Veterinary library e-resources.
The chronological distribution of cited material shows that the students preferred to use recent and up-to-date material indicating the need for acquiring current library material for the library collection. The authorship traits of journal citations reflect that the Veterinary medical undergraduates had mostly cited journal articles which have been produced as collaborative outputs.

The results of this study will aid to inform decisionmakers on improving library instruction. The results could be presented to the Faculty and discuss on the Faculty expectations and current strategies in guiding undergraduate research and how librarians could help by improving library instruction.

However, this study has some limitations. This study analyzed all citations in aggregate; hence it does not provide insight into individual use of information resources (Wilson, 2012). Also, the study examined only reference lists of each dissertation which does not ascertain whether all those resources were effectively used within the text. This study focused on final year project reports, therefore the resources utilized are predominantly fulfilling undergraduates’ research purposes only.

This study can be further improved by conducting surveys and interviews among library users in order to capture insights into the usage and to enhancing the collection in a user-oriented manner. Also, it is imperative to take into account the commendations of the Faculty to verify whether the current library system is in alignment with the students’ requirements.
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