

**AN ANALYSIS OF ENCYCLOPAEDIA CITATIONS IN  
UNIVERSITY OF AUCKLAND DOCTOR OF PHILOSOPHY  
DISSERTATIONS (2007 AND 2008)**

**by**

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## ABSTRACT

It is currently unknown to what extent encyclopaedias are cited in academic research in New Zealand. To provide preliminary findings on the use of encyclopaedias in university research and offer some evidence relating to the use of collaborative encyclopaedias in academic research, a quantitative empirical study of citations of encyclopaedias in 147 Doctor of Philosophy (PhD) Dissertations from the University of Auckland was made. Results included finding citations to encyclopaedias made up a very small ( $n = 23$ , or 0.1% in 2007;  $n = 62$ , or 0.3% in 2008) proportion of total citations. Of these, traditional style encyclopaedias were more frequently (61%) used than collaborative (39%) style encyclopaedias such as Wikipedia and the Encyclopaedia of Philosophy of Education. Wikipedia, a general, collaborative, and on-line format encyclopaedia, received the highest number of citations ( $n = 32$ ). By subject, Computer Science and Statistics listed the highest number of 14 citations to Wikipedia; Engineering (Software, Mechanical and Electrical and Electronic) had 8 Wikipedia citations; English, French, Political Studies and Theology received 9 citations; and Nursing included one citation to Wikipedia. With the widely known concerns expressed about the suitability of citing Wikipedia at any level of academic research, it is surprising that this study found (albeit small) a measurable level of citations to Wikipedia in PhD dissertations in New Zealand. The results of this study may be useful to university librarians and faculties in training students before they begin research for higher degrees.

**Keywords:** encyclopaedia, citations, collaborative, academic research.

## **1. PROBLEM STATEMENT**

Encyclopaedias are a key component of the general and subject reference collections in academic libraries, but it is unknown to what extent they are cited in academic research in New Zealand.

Traditionally, encyclopaedias were summaries of current knowledge (Kister, 1994, p. 3), and were written by subject experts and controlled by identifiable editorial management.

Academic libraries hold printed copies or subscribe to electronic versions of encyclopaedias, which may be either general in focus or provide in-depth information on a specific topic for users (Cassell & Hiremath, 2006a, pp. 70, 83), for example, an article on computer ethics and intelligent technologies ("Computer ethics and intelligent technologies," 2008, Encyclopedia of Information Ethics and Security). The levels of encyclopaedia usage have not been the main focus in previous citation studies but available figures, for example, 1.14% of citations in Master of Library and Information Science dissertations ( $n = 40$ ) from the period 2000-2005 at the University of Malaya (Yeap & Kiran, 2008, p. 33), indicate a very low rate. This raises questions such as whether encyclopaedias are regarded as irrelevant and therefore not used, or are consulted but uncited, or even question users' ability to seek out a wide range of sources in research. It would appear that little is known about how encyclopaedias are used, or the extent and reasons for their use. Citation analysis may provide a starting point to obtain some knowledge about the use of encyclopaedias in university research, which could be followed by a qualitative study that explores how researchers use encyclopaedias. The results of this study may therefore assist librarians in training users and in promoting collection resources.

Since the advent of online collaborative encyclopaedias, such as Wikipedia (Wikipedia Foundation, 2009), containing information whose validity and reliability cannot be proven

through either a peer review process or recognized editorial management, there has been concern (Gorman, 2007; Santana & Woods, 2009a; Svoboda, 2006; Waters, 2007) that these encyclopaedias are cited in university research. These concerns result from Wikipedia's articles which are written by anonymous authors and edited by people of unknown qualifications and credentials; and articles which are often written without the inclusion of supporting references, and which, when corrected, can be changed to be misleading by people with agendas. Without this background knowledge, articles cannot easily be verified as reliable and accurate, with the latter qualities being essential components in university research.

To provide preliminary findings on the use of encyclopaedias in university research, the outcome of which may be useful to librarians teaching information literacy, and offer some evidence relating to the use of collaborative encyclopaedias in academic research in New Zealand, this research project will conduct a comparative study of citations of encyclopaedias in Doctor of Philosophy (PhD) Dissertations submitted in 2007 and 2008 to the University of Auckland.

## **2. LITERATURE REVIEW**

### ***2.1 Approaches to Citation Analysis***

Garfield (1996) provides the basis of the normative theory of citation, which forms a part of the theoretical framework of this research, with his suggestion that there are fifteen main reasons for citations:

- 1. Paying homage to pioneers.*
- 2. Giving credit for related work (homage to peers).*

3. *Identifying methodology, equipment, etc.*
4. *Providing background reading.*
5. *Correcting one's own work.*
6. *Correcting the work of others.*
7. *Criticizing previous work.*
8. *Substantiating claims.*
9. *Alerting researchers to forthcoming work.*
10. *Providing leads to poorly disseminated, poorly indexed, or uncited work.*
11. *Authenticating data and classes of fact – physical constants, etc*
12. *Identifying original publications in which an idea or concept was discussed.*
13. *Identifying the original publication describing an eponymic concept or term as,  
e.g., Hodgkin's disease, Pareto's Law, Friedel-Crafts Reaction, etc.*
14. *Disclaiming work or ideas of others (negative claims).*
15. *Disputing priority claims of others (negative homage)*

(Garfield, 1996, pp. 451-452)

However, social constructivist theorists claim social ulterior motives and biased influences such as reward (Kaplan, 1965, p. 181), persuasion by citing authoritative peers, to illustrate the importance of results compared to current research, to fill a knowledge gap (Gilbert, 1977, pp. 115-117), distinction of degree (those graduating with "cum laude" honours are

more likely to be cited, Van Raan, 1998, p. 132), “hat-tipping, premeditation, conspiratorial cross-referencing, and political considerations” (Thorne, 1977, pp. 1159-1160) are more likely to influence citation behaviour.

Cozzens (1989) advocates a more ‘multidimensional’ (Camacho-Minano & Nunez-Nickel, 2009, p. 755) approach that combines the two theories with common factors: quality and importance from the social constructivist side, and relevance, utility and influence from the normative part (Cozzens, 1989, p. 441). Other advocates (Baldi, 1998b; Van der Veer Martens & Goodrum, 2006; Van Raan, 1998) tend to agree the motivations for citing behaviour are interrelated and may range between positive, negative, functional and control reasons, for example: most relevant work on subject, physical accessibility, reviewer’s request, article size (Baldi, 1998a; Bonzi & Snyder, 1991; Harwood, 2008; Liu, 1997).

In addition to the three main citation theories, there are other beliefs or laws that may be used when interpreting bibliometric studies: the Matthew effect (Merton, 1968, pp. 56-63), a derivative of the social constructivist ‘reward’ system, where authors, already well known, tend to be cited more often than less recognized authors in the same field regardless of source accessibility (Beck & Manuel, 2008, p. 187); publication bias, that occurs when research articles which are more positive and significant tend to be published (Beck & Manuel, 2008, p. 187); Lotka’s Law (Hertzal, 2003, pp. 303 - 306), which deems a small proportion of authors in a field of study tend to produce a large number of publications (Borgman & Furner, 2002, p. 49), which increases their chances of being cited than the larger proportion of authors who may only have published once (Beck & Manuel, 2008, p. 187); and Bradford’s Law (Hertzal, 2003, pp. 306 - 311) relates to the trend that a



small number of journals in a field of study tends to publish almost a third of all articles, which results in citations and library holdings concentrating on these journals (Beck & Manuel, 2008, p. 188).

Although the normative, social constructivist, and multi-dimensional citation theories, and the bibliometric 'laws' have often been used to analyse article citations in journals, they have not been identified in this paper's literature search as having been used to examine citations to encyclopaedias, whether general or discipline specific. The multi-dimensional approach is the most probable framework for the citation of encyclopaedias as it contains the more varied reasons to explain citation behaviour, but the normative and social constructivist factors of quality, importance, relevance and utility remain strong influences. Factors which may affect the citation of encyclopaedias include their reputation, editorial policies, language, content quality and currency, accessibility of medium (online or printed), knowledge of their range of content, and even the citer's level of information literacy (as defined in Cassell & Hiremath, 2006b, pp. 273-276). It is uncertain that the bibliometric 'laws' can be used to analyse the citation of encyclopaedias because this study will be more an 'evaluative literature usage count' (Hertzel, 2003, p. 296) of citations, than a study of literature within a discipline with time or geographic variables.

## ***2.2 Traditional Encyclopaedias***

The limited amount of literature available about traditional encyclopaedias discusses their continued role and changing expectations in providing information. Crothers (2008) queries whether they should be regarded as part of academic literature and cited in research articles, believing they are more 'archival' and 'textbook' than academic research (p. 175). He also raises issues such as the currency of information in printed versions, quality control

in the range and balance of topics covered, classification framework, writing style, and authoritativeness (p. 177). The future of similar anthologies is also raised by Raven and Goldman (2007) who discuss whether the price of providing additional data and hyperlinks will undermine traditional articles in the Oxford Dictionary of National Biography but conclude that they may be essential to its future survival (pp. 1005-1006).

However, contrary to some of the above criticisms, traditional encyclopaedias are changing to include primary research, are increasingly available online (Maron & Smith, 2009, Types of digital scholarly resources), and there are growing numbers of specialised encyclopaedias such as the printed World Encyclopedia of Political Systems and Parties, the Encyclopedia of American Foreign Policy, and the online Sage Encyclopedia of Social Science Research Methods.

The issue of currency of information, particularly in printed editions (Crothers, 2008, p. 175) is resolved with Web-based encyclopaedias such as the Stanford Encyclopedia of Philosophy and Internet Encyclopedia of Philosophy which are more easily updated (Elvebakk, 2008, The encyclopedias, paras 1-3). The additional advantages of 'dynamic' Web-based encyclopaedias include the ability to include information without size or volume restrictions, reducing the time delay between article completion and publication, removing the expense of printing or loading to disks, and being more responsive to changes in new technology (Hammer & Zalta, 1997, pp. 48-49). Furthermore, Pack (2004, pp. 30, , para. 1) describes the Internet Encyclopedia of Philosophy as containing original articles as well as adapted work, which contrasts with Kister's (1994, p. 4) earlier statement "almost all encyclopaedias are tertiary compilations based on secondary sources".

## **2.3 Collaborative Encyclopaedias**

Collaborative encyclopaedias are so called for the reason that their articles are not written by one author but many; anyone with 'knowledge' or 'expertise' is able to collaborate with other interested parties in writing an article on a subject or topic. In the example of Wikipedia (2009), authors originally were able to contribute anonymously; articles are monitored by an unnamed group of volunteer 'editors'. More recently, Wikipedia has modified its policy of anonymity to new contributors in an attempt to minimise deliberate misinformation ("Wikipedia tightens editing policy," 2009).

Citizendium ("Citizens' compendium," 2009) is another collaborative encyclopaedia, but one that requires authors and editors register their names and credentials to increase the accuracy and reliability of articles. Open-Site (Open-Site Foundation, 2009) is also a collaborative encyclopaedia whose articles are edited by volunteers. Other characteristics of these encyclopaedias are they are all freely accessible via the Internet, and their content is able to be used under Creative Commons (CC Aotearoa New Zealand, n.d.) or GNU Free Documentation Licence ("GNU operating system," 2009) guidelines. An example of a subject specific collaborative encyclopaedia is the Encyclopaedia of Philosophy of Education (2010) which welcomes alternative views and articles to be submitted for peer review before publishing on their website.

Current literature on collaborative encyclopaedias centres on their use and role in academic research. Studies assessing Wikipedia's articles (in historical articles, scientific citations and popular information) for comprehensiveness, reliability, quality and accuracy (Nielsen, 2007; Rector, 2008; Royal & Kapila, 2009) have found accuracy, quality and bias to be areas of concern (Rector, 2008; Royal & Kapila, 2009) but scientific citations to be generally reliable

(Nielson, 2007, abstract). Gorman (2007), Svoboda (2006), Santana and Woods (2009), and Waters (2007) discuss the unsuitability of using Wikipedia in academic research, citing lack of accuracy (Waters, 2007), “contributing to information entropy” (Gorman, 2007, p. 275), and lack of transparency in editorial control and author management (Santana & Woods, 2009b).

Lim’s (2009) web survey of undergraduate students at a United States university investigated how and why they use Wikipedia, their opinion of its information quality, and students’ confidence in evaluating Wikipedia’s information quality (p. 2189). Results were to some extent contradictory with approximately a third of respondents indicating Wikipedia was used for academic purposes, but did not use it for “finding articles or references or for conducting research” (Lim, 2009, p. 2195). A section of Schweitzer’s (2008) study of Wikipedia included examining its use by undergraduate psychology students at Arizona State University. Analysis of questionnaires completed by first and senior year undergraduates showed 0.6% and 4.5% respectively cited Wikipedia in a paper or project (Schweitzer, 2008, pp. 83-84). Thus these studies indicate a collaborative encyclopaedia was used and cited at undergraduate university level, but their results cannot be interpreted to suggest collaborative encyclopaedias will be cited to any extent in higher degrees.

## ***2.4 Citation Studies of Theses and Dissertations***

In the area of collection management, previous studies (Edwards, 1999; Haycock, 2004; Kuyper-Rushing, Mar 1999; Pancheshnikov, 2007; Waugh & Ruppel, 2004; Yeap & Kiran, 2008) have examined citations from students’ theses and dissertations and compared the cited publications to their availability in library collections; almost all using student papers from a single department or subject at a specific university. Kuyper-Rushing (1999) chose to

study dissertations from music doctoral programs across the United States to investigate the core journals cited. Kushkowski, Parsons, and Wiese's (2003) longer study analysed citation characteristics and trends found in master's and doctoral papers written between 1973 and 1992 from Iowa State University. Biele, Boote and Killingsworth (2004) believe that studies using data from a single institution do not produce results which could be generalized to other learning institutions or libraries; their study of education dissertations were selected from three US institutions (p. 348).

However, the predominant focus of these studies has been on serials such as journals, books and monographs with any resulting data on encyclopaedia citations only a by-product of these studies. These studies have either revealed a very low rate of citations of encyclopaedias, for example, 1.14%, (Yeap & Kiran, 2008, p. 33), or contained little or no detail on material types to show if encyclopaedia citations were counted (Biele, Boote and Killingsworth, 2004; Edwards, 1999; Haycock, 2004; Kushkowski, Parsons, & Wiese, 2003; Kuyper-Rushing, 1999; Pancheshnikov, 2007; Waugh & Ruppel, 2004).

The limitations of using citation analysis are widely known according to MacRoberts and MacRoberts (1989) who point out in addition to the variety of influences upon citation behaviour (as outlined above in the normative, social constructivist and multi-dimensional theories), the number of citations in a paper's bibliography may not equal the influences in the paper's content which should be referenced (p. 343). Their study of 15 genetics history papers "found that 719 references were needed to cover the information in the papers but there were only 216 references made, a coverage of only 30%...the most thorough scholar cited only 64% of his influences" (MacRoberts & MacRoberts, 1989, p. 343). In addition to the 'informal influences' or 'tacit knowledge' (p. 344) not cited may also include background

knowledge, where encyclopaedias may have been consulted for preliminary reading before proceeding to specific research on the topic required. The background reading may become internalized to the extent it is believed the knowledge was already present and therefore the original source is not referenced. MacRoberts and MacRoberts (1989, p. 345) proceed to suggest discussing citation motivations of papers with their authors would be ideal but time-consuming. Three studies (Brooks, 1985, 1986; Prabha, 1983) have conducted such surveys of authors.

### **3. THEORETICAL FRAMEWORK**

Encyclopaedias can be defined as “a reference source published in either print or electronic form, summarizing basic facts and concepts on important subjects, or in a specialized encyclopedia, a particular subject, to provide a framework for initial understanding or springboard for further investigation” (Kister, 1994, pp. 3, 4). Based on this definition, the possible reasons why encyclopaedias would be used in academic research are to obtain background knowledge, to clarify concepts and definitions, to obtain an initial idea of the scope of a topic or subject before beginning specific research, and to consult the bibliography or recommended reading list following an article (Cassell & Hiremath, 2006a, p. 72). This project seeks to measure the extent to which encyclopaedias (traditional and collaborative) are cited in New Zealand PhD dissertations as a prelude to future research into the reasons for citing encyclopaedias.

In measuring the extent to which collaborative encyclopaedias are cited in New Zealand PhD dissertations, this study seeks evidence of the use of collaborative encyclopaedias in New Zealand academic research and to examine the possible reasons (for example currency of information, unavailability of other sources) for their use given the concerns about their

reliability, accuracy, and bias. The titles of collaborative encyclopaedias used, relevant disciplines, and dissertation topics will be described.

In addition to describing the patterns of encyclopaedia citations found, and exploring if these fit the bibliometric 'laws' (Hertz, 2003; Merton, 1968) described in the 'Approaches to citation behaviour' section above, this study will also look at the reasons for citing encyclopaedias within the framework of the theories of citation behaviour. The normative (Garfield, 1996), social constructivist (Gilbert, 1977; Kaplan, 1965; Thorne, 1977; Van Raan, 1998, and multidimensional (Baldi, 1998b; Cozzens, 1989; Van der Veer Martens & Goodrum, 2006) theories propose possible reasons for motivating citation behaviour ranging from citing background reading, reward and persuasion, to accessibility of publications; this study's analysis will consider which theory best describes the reasons for citing encyclopaedias.

This study is intended as a preliminary quantitative analysis of encyclopaedia citations in New Zealand PhD dissertations; it is hoped that this study will stimulate future in-depth investigation in this field.

## **4. METHODOLOGY**

### ***4.1 Project Description***

This project is a quantitative study examining a sample of New Zealand PhD dissertations for encyclopaedia citations, and a comparative analysis of the citations by quantity, title, format and discipline. This data may be used to point towards the characteristics of encyclopaedias used in academic research and contribute towards librarians training users in information literacy to find a wider range of sources for research.

## **4.2 *Project Objectives***

- To establish if encyclopaedia collections in university libraries are used as resources by PhD researchers
- To determine the level of use of online and print-based encyclopaedias by PhD researchers

## **4.3 *Research Questions***

1. To what extent are encyclopaedias cited in the sample of PhD dissertations in 2007 – 2008, compared to other types of citation sources (for example, monographs, journals, conference proceedings)?
2. To what extent do the proportions of encyclopaedia citations in the sample in 2007 – 2008 vary by academic discipline?
3. To what extent is the proportion of encyclopaedia citations to discipline-specific or general encyclopaedias? What are the titles of encyclopaedias cited? Are they in printed or electronic format?
4. To what extent is the proportion of citations to 'traditional' encyclopaedias and collaborative encyclopaedias?
5. What are the characteristics of the two most cited encyclopaedias, the features of their citations, and the topics of the dissertations which have cited them?

## **4.4 *Definitions***

### **4.4.1 *Specification and definition of variables:***

- Citations: listing by author(s), title, publication title, date/place of publication (for books) to acknowledge sources of information or quotes referenced in the article or paper ("Citation," n.d.; Moed, 2005, p. 11)



- PhD dissertation: a written essay, based on research, prepared by a candidate to meet the full or partial requirements of a Doctor of Philosophy degree ("Dissertation," 2008, p. 415)
- disciplines: subject fields of academic study, requiring specific teaching and research within higher education ("Disciplines," 2009)
- encyclopaedias: "a reference source published in either print or electronic form, summarizing basic facts and concepts on important subjects, or in a specialized encyclopaedia, a particular subject, to provide a framework for initial understanding or springboard for further investigation" (Kister, 1994, pp. 3, 4).
- traditional encyclopaedias: contain articles signed or initialled by their author who is typically a qualified expert in the field, the articles and publication is managed by recognized and qualified editorial management
- collaborative encyclopaedias: articles can be co-written by many authors, often anonymously; anyone with 'knowledge', or 'expertise' is able to collaborate with other interested parties in writing an article on a subject or topic. Article editing may also be done anonymously by volunteers

#### 4.4.2 *Interrelationships:*

- the dependent variable to be measured are the citations from each dissertation
- independent variables: factors which relate to and have a causal influence on citations in this project are the encyclopaedias, specifically title, date, general or specific by subject; print or electronic format, traditional or collaborative); dissertations; the disciplines in which each dissertation is written

## **4.5 Population**

Within universities, research is carried out at varying levels: undergraduate assignments, postgraduate papers and reports, Honours papers, Masters theses, Doctoral dissertations and academic staff in faculties.

In New Zealand, there are currently eight universities, many of whom, in addition to offering study in the commerce, fine arts, science, and social science disciplines, make available study in specialised subjects such as medicine, dentistry, agriculture, veterinary science, and biomedicine.

## **4.6 Sample**

To fit the cross-disciplinary requirements of the study, the sample population selected for research was a single university which had all its graduate research available online.

PhD doctoral dissertations were selected for analysis in this study as being advanced research, they are available online for viewing, research and use (subject to copyright), are required to have lengthy and detailed bibliographies, were in a wide range of subjects, and were in suitable numbers to enable a survey to be made.

A convenience sample of all PhDs completed in 2007 and 2008 was selected from the University of Auckland's online research database, ResearchSpace@Auckland (University of Auckland, 2009), a total of 147 (73 in 2007, 74 in 2008).

## **4.7 Delimitations**

A convenience sample of PhD dissertations available online was chosen to due to the time constraints of this project. Masters theses, honours and postgraduate research reports and

papers were excluded as not all document types were available online; this presents opportunities for further research in this area in the future.

The period of study, 2007 and 2008, was selected to increase the possibility of citations of on-line accessible and collaborative encyclopaedias (being a relatively recent trend) and to ensure all PhDs completed in these years had been downloaded into university research databases.

To meet the criteria of a cross-disciplinary sample and the highest numbers possible over the specified period, PhD dissertations were selected from the University of Auckland.

The PhD Theses collection in University of Auckland's online research database, ResearchSpace@Auckland (University of Auckland, 2009) included a number of MD dissertations (Doctorate of Medicine), and PhD dissertations which were only available in printed form or had access restrictions. The MD dissertations were excluded; the time restrictions of this project and University of Auckland Library staff unavailability resulted in the print and embargoed dissertations being unavailable for inclusion in this study. Two dissertations in the Chemistry discipline were unable to be examined in the timeframe as they contained multiple chapter reference lists with many duplicate entries and did not list the journal article titles cited. These delimitations reduced the final numbers of bibliographies which could be studied, with the effect being some bias could result through disciplines being under-represented. The following table list the numbers and disciplines of dissertations not examined:

Discipline	2007 ( <i>n</i> )	2008 ( <i>n</i> )
Accounting		1
Anatomy with Radiology	1	
Biological Science	3	3
Chemistry		2

Computer Science		1
Education	1	
Engineering (Chemical & Material)		1
Engineering (Civil)		1
English		1
Film, Television & Media Studies		1
Health Psychology	2	
History		2
Law	1	1
Management & Employment Relations	1	
Maori Studies	1	
Marketing	1	
Medicine (MD)	4	
Molecular Medicine & Pathology		1
Optometry	2	
Physiology	1	
Sociology		1
Totals	18	16

**Table 1: Excluded 2007 & 2008 Dissertations by Discipline**

## **4.8 Limitations**

The limitations of citation analysis include the possibility that only the citations present may be studied, that is, if the full text of the paper was examined, more (or less) citations, such as those on background material, could be required to reference the paper's content, but were not provided by the author (MacRoberts & MacRoberts, 1989, p. 373). Another disadvantage to studying the motivations for citation behaviour without surveying the authors concerned, results in more speculative and general reasons than from qualitative surveys of authors as has been undertaken by Brooks (1985, 1986) and Prabha (1983).

Biele, et al. (2004 p. 347-348) also question the validity of using dissertation citation analysis for evaluating research collections due to failure to assess their quality and appropriateness, and query with Haycock (2004) whether all PhD students have the necessary high level of information literacy to find the best sources of research for their dissertations (Haycock, 2004, p. 106). Part of Biele, et. al's (2004, p. 349) study assessed citations on criteria of scholarliness, currency and appropriateness. Further, they agree with Kuyper-Rushing (1999) that studies on one subject confined to a single institution can produce distorted results (Kuyper-Rushing, Mar 1999, pp. 153-163).

Another limitation of using citation analysis as a collection management assessment tool is the recommendation that it should be used in conjunction with other methods such as user studies, circulation statistics, and interlibrary loans to assess collections (Biele, Boote, & Killingsworth, 2004; Edwards, 1999; Kushkowski, Parsons, & Wiese, 2003; Kuyper-Rushing, Mar 1999).

Lower levels of academic research such as Master's theses and postgraduate research papers and reports may reveal higher levels of encyclopaedia citations, whereas this study will use PhD dissertations as its target population.

It was proposed to use analytical statistics to examine the bibliographies if there was sufficient data, however this proved not to be the case and descriptive statistics have been utilised to examine the findings.

Although this study may not be able to overcome all the limitations as outlined above, it is intended to provide some evidence on the types and frequency of citations to encyclopaedias to judge if concerns regarding the citation of collaborative encyclopaedias are warranted, and contribute additional data to assist in a review of academic library

resources such as that recently conducted by the Victoria University of Wellington Library (Victoria University of Wellington, 2009).

#### **4.9 Procedures**

The selected dissertations were retrieved from the research database and the full text of papers downloaded. The title page (although the research is anonymous), reference list or bibliography of each dissertation was printed and assigned an identifying number before beginning analysis.

The following data from each bibliography was entered into an MS Excel spreadsheet: dissertation subject or discipline; citation numbers of each publication type, such as encyclopaedia, journal, newspaper/periodical, monograph, website; encyclopaedia citations, categorize further by: title, print or online format, and in collaborative or traditional form.

The project coding sheet is attached as Appendix A, with the source categories defined as (based on Knight-Davis & Sung, 2008, p. 452):

- the categories of journal, book/monograph, government documents, newspapers/periodicals, theses/dissertations, conference papers/proceedings include their electronic or digital surrogates and 'in press' and unpublished material from the same source or of the same type
- the website/page category includes web documents which are not included in the above category
- the audio/visual category included podcasts and commercial television or radio recordings

- primary sources include personal interview transcripts and recordings, field reports, surveys, personal communication, emails, and archive records
- the dictionary, biography, thesauri and bibliography category contained references to these sources
- the encyclopaedia columns measures any encyclopaedia cited; their titles are noted in a separate column, as is the format in which they were accessed; print or on-line
- the 'other' category includes any remaining sources unable to be classified in the above categories, or which had insufficient information in the citation
- 'discipline' indicates the faculty or department origins of the dissertation

## 5. RESULTS & DISCUSSION

Table 2 (below) shows the numbers and percentage of citations by source in 2007 and 2008 PhD dissertations and relates to Research question 1, that encyclopaedias in 2007 PhD dissertation bibliographies number 23 out of 22,760 citations, or 0.1% of the total. Of 2008 PhD dissertation bibliographies, encyclopaedia citations number 61 from a total of 20,308 citations, or 0.3%. In contrast, journals and monographs constitute the largest proportion of sources of citations, making up 11,881 (52.2%) for journals and 8,021 (35.2%) for monographs in 2007, and 10,980 (54.1%) journals and 6,264 (30.8%) monographs in 2008. Thus Table 2 illustrates encyclopaedias comprise the smallest proportion of sources of citations in 2007 and is second only to Audio/Visual sources ( $n=50$ , or 0.2%) in 2008.

Citation Sources	2007		2008	
	<i>n</i>	%	<i>n</i>	%
Journals	11881	52.2%	10980	54.1%
Monographs/Books	8021	35.2%	6264	30.8%
Conference Papers & Proceedings	1027	4.5%	903	4.4%
Government Documents	577	2.5%	330	1.6%
Theses/Dissertations	306	1.2%	240	1.2%
Primary Sources	279	1.2%	684	3.4%
Newspapers/Periodicals	270	1.2%	244	1.2%
Other	187	0.8%	379	1.9%
Websites	93	0.4%	95	0.5%
Dictionaries/Biographies/Thesauri	52	0.2%	78	0.4%
Audio/Visual Sources	44	0.2%	50	0.2%
Encyclopedias	23	0.1%	62	0.3%
Totals	22760	100%	20309	100.0%

**Table 2: Citations by Material Source in 2007 & 2008 PhD Dissertations**

Table 3 details the numbers of encyclopaedia citations found in each academic subject or discipline, and provides the information required in Research question 2 – the numbers of encyclopaedia citations by discipline in 2007 and 2008. The citations are distributed over varying disciplines, with the highest number in English; seventeen citations to encyclopaedias were counted in one English dissertation. The discipline of Biological Sciences recorded the third highest number ( $n = 11$ ) of encyclopaedia citations in 2008, this was largely due to two bibliographies listing seven and three citations respectively, plus one bibliography with one citation. A Statistics dissertation bibliography listed 12 encyclopaedia citations in 2008, contributing to an overall figure of 13 in the Statistics discipline.

Discipline	2007	2008
Anthropology	1	
Applied Language Studies & Linguistics	1	
Biological Sciences		11
Computer Science		2
Development Studies	1	
Education	1	



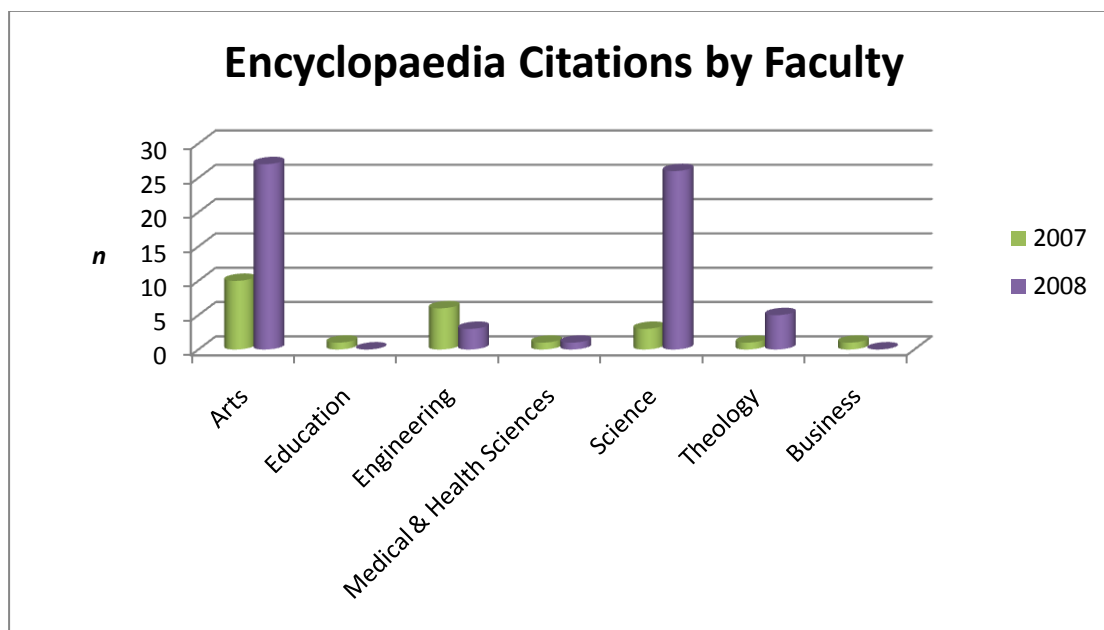
Engineering (Electrical & Electronic)		1
Engineering (Software)	6	
Engineering (Mechanical)		2
English		17
French		3
Geography	1	
History		3
Information Systems & Operations Mgmt	1	
Linguistics	6	
Nursing	1	
Political Science	1	2
Psychiatry & Behavioral Sciences		1
Psychology	2	
Sociology/Women's Studies		2
Statistics		13
Theology	1	5
Citation Totals	23	62

**Table 3: Encyclopaedia Citations by Discipline**

By overall disciplinary groups, figure 1 illustrates that the highest number of encyclopaedia citations are made by the Arts and Science faculties in 2008, with 27 and 26 citations respectively.

Encyclopedia Citations by Faculty		
	2007	2008
Arts	10	27
Engineering	6	3
Science	3	26
Education	1	0
Medical & Health Sciences	1	1
Theology	1	5
Business	1	0
Citation Totals	23	62

**Table 4: Encyclopaedia Citations by Faculty**



**Figure 1: Encyclopaedia Citations by Faculty**

Referring to Research question 3, Tables 5 and 6 show the proportion of encyclopaedia citations to general encyclopaedias and discipline-specific (or specialised) and their format. The majority of encyclopaedias ( $n = 19$ ) referenced were specific to the discipline studied and were accessed in printed format; only eight general encyclopaedias were used. The Encyclopaedia of New Zealand is also available in online form as part of the Te Ara Encyclopaedia of New Zealand; three citations were sourced online and three other references to the Encyclopaedia of New Zealand were to its printed version. Six encyclopaedias were used in online format, of which only one was discipline-specific, the Encyclopaedia of Philosophy of Education. The general Encyclopaedia Britannica, available in both printed and online versions, received one citation each to the two versions. The highest number ( $n = 32$ ) of citations to any one encyclopaedia is Wikipedia, followed by the Encyclopaedia of Marine Mammals ( $n = 10$ ).

Title	Citations (n)	Print	Online
Wikipedia	32		*
Encyclopaedia of NZ	6	*	*
Te Ara Encyclopaedia of NZ	5		*
Encyclopedia of Britannica	2	*	*
Cyclopaedia of NZ	1	*	
Encarta Online Encyclopedia	1		*
Encyclopedia Americana	1	*	
Modern Encyclopaedia of Australia and NZ	1	*	
<b>Totals</b>	<b>49</b>	<b>5</b>	<b>5</b>

**Table 5: General encyclopaedias by title, citations and format**

Title	Citations (n)	Print	Online
Encyclopedia of Marine Mammals	10	*	
Encyclopedia of Language & Linguistics	6	*	
Companion Encyclopedia of History of Medicine	2	*	
Encyclopedia of Early Christianity	2	*	
Encyclopaedia of Language & Education	2	*	
Collectors' Encyclopedia of Shells	1	*	
Encyclopedia of Creativity	1	*	
Encyclopedia of Life Sciences	1	*	
Encyclopedia of Literature	1	*	
Encyclopaedia of Missions. Descriptive, historical, biographical, statistical, with a full assortment of maps, a complete bibliography, and lists of Bible versions	1	*	
Encyclopedia of Networking & Telecommunications	1	*	
Encyclopedia of Nutritional Supplements	1	*	
Encyclopedia of Philosophy of Education	1		*
Encyclopedia of Post-Colonial Literatures in English	1	*	
Encyclopedia of Psychological	1	*	

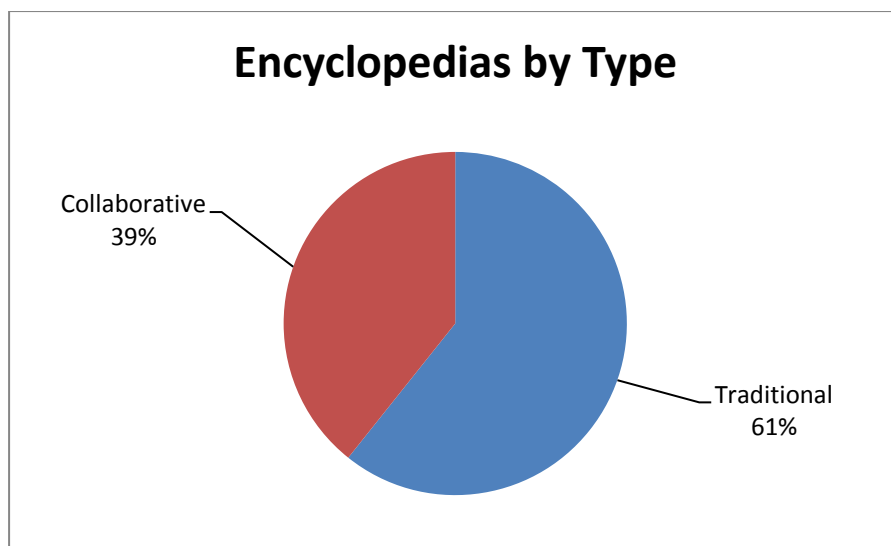
Assessment			
Encyclopedia of Software Engineering	1	*	
Encyclopedia of World Literature	1	*	
Illustrated Encyclopedia of Maori Myths & Legends	1	*	
Social Science Encyclopedia	1	*	
Totals	36	18	1

**Table 6: Subject specific encyclopaedias by title, citations, and format**

In relation to Research question 4, only Wikipedia and the Encyclopaedia of Philosophy of Education ( $n = 33$ , 39%) are collaborative with the characteristic that any interested party may contribute. However, unlike Wikipedia, the Encyclopaedia of Philosophy of Education states that entries will be peer-reviewed ("Adding your entry," 2010), all articles and entries are accompanied by the author's name, and the editorial board lists the names of current and founding editors. Also unlike Wikipedia, although the Encyclopaedia of Philosophy of Education is an Internet-based encyclopaedia, it provides access to archived older versions of its pages ("Old revisions," 2010). The remaining encyclopaedia titles ( $n = 52$ , 61%) are traditional, characterised by the publishing of the names of editors and authors, and an obvious trait of printed encyclopaedias, the articles and information contained within, once published, cannot be changed without printing a new volume or version. The printed versions of the Encyclopedia of Life Sciences (Wiley-Blackwell, 1999), Encyclopedia of Missions (Making of America, 2005), Encyclopedia of Networking and Telecommunications (Sheldon, 2001) and the Encyclopedia of New Zealand (Te Ara, 1966) are also available on-line but are not able to be altered or updated unlike true Internet-based encyclopaedias. Table 7 and Figure 2 (below) depicts the proportions of collaborative and traditional encyclopaedias cited:

	Collaborative	Traditional
Wikipedia	32	
Philosophy of Education	1	
Encyclopedia of Marine Mammals		10
Encyclopaedia of NZ		6
Encyclopedia of Language & Linguistics		6
Te Ara Encyclopedia of NZ		5
Encyclopedia Britannica		2
Encyclopedia of Early Christianity		2
Encyclopedia of History of Medicine		2
Encyclopedia of Language & Education		2
Collectors Encyclopaedia of Shells		1
Cyclopaedia of NZ		1
Encarta Online Encyclopedia		1
Encyclopedia Americana		1
Encyclopedia of Creativity		1
Encyclopedia of Life Sciences		1
Encyclopedia of Literature		1
Encyclopedia of Missions		1
Encyclopedia of Networking & Telecommunications		1
Encyclopedia of Nutritional Supplements		1
Encyclopedia of Post-Colonial Literatures in English		1
Encyclopedia of Psychological Assessment		1
Encyclopedia of Software Engineering		1
Encyclopedia of World Literature		1
Illustrated Encyclopedia of Maori Myths & Legends		1
Modern Encyclopedia of Australia & NZ		1
Social Science Encyclopedia		1
Totals	33	52

**Table 7: Citations to traditional and collaborative encyclopedias**



**Figure 2: Encyclopaedias by Type**

The characteristics of the two most cited encyclopaedias, the Encyclopedia of Marine Mammals and Wikipedia, are diverse: the former is a specialised encyclopaedia (cited ten times by two dissertations) in Biological Science, and available only in printed format. It is a traditional encyclopaedia containing entries by named authors who most probably are experts and well known to those familiar with the field of study. Wikipedia was cited 32 times by varied disciplines, and is a general, collaborative (and anonymously authored) encyclopaedia available only via the Internet. Table 8 provides an outline of their citations and the relevant topics or disciplines (with reference to Research question 5):

	Topic/ Discipline	Dissertation Bibliographies ( <i>n</i> )	Citations ( <i>n</i> )	Nature of Citation
Encyclopedia of Marine Mammals	Biological Sciences – Marine	2	10	Original source of information
Wikipedia	Computer Science	1	2	Define concept Detail mathematical function
	Engineering – Software	1	5	Define terms/ concept
	Engineering –	1	2	Define concept and

	Mechanical Engineering - Electrical and Electronic	1	1	process Define concept
	English	1	2	Historical map Quote
	French	1	2	Detail theory Define term
	Nursing	1	1	Define concept
	Political Studies	1	1	Historical detail
	Statistics	1	12	Define terms, concepts, processes
	Theology	2	4	Define concept Historical texts (out of copyright)
Totals		13	42	

**Table 8: Characteristics of the two most cited encyclopaedias**

Table 8 shows by faculty, Science (made up of Computer Science and Statistics) listed the highest of 14 citations to Wikipedia, Engineering (Software, Mechanical and Electrical and Electronic) have 8 Wikipedia citations; Arts (English, French, Political Studies and Theology) received 9 citations; and the Medical and Health Sciences faculty (Nursing) contained one citation to Wikipedia (overall total  $n=32$ ). The column listing the number of dissertation bibliographies illustrates the total ( $n = 13$ ) authors involved as part of this section of analysis; thereby showing only 13 or 8.8% of a total of 147 dissertations examined are in this category. The total number of individual authors ( $n = 11$ ) citing Wikipedia remains very small as a proportion of total dissertations, comprising 7.4% of 147 dissertations.

The table also lists the nature or probable reasons for the citations, which were obtained by examining the texts of the citations. This was more difficult with citations to the Encyclopedia of Marine Mammals which consisted of the entry's title, author and page numbers. The entry titles tended to be specific names of mammal species relating to the dissertation subject, leading to the conclusion that the citations were made to the

encyclopaedia as the original source of information. Citations to Wikipedia were more specific as the concept, term, process or mathematical function was listed as the title, and the URL (Uniform Resource Locator) address was also listed. As Table 8 shows, citations to Wikipedia tended to be for clarification or defining terms, concepts and processes; there appeared to be only one quote, and three citations were for a historical map and details.

## **6. SUMMARY & CONCLUSIONS**

This study has examined the extent to which encyclopaedias are cited in a sample of New Zealand PhD dissertations. It has looked at characteristics of cited encyclopaedias, specifically if they are general or discipline-specific in type, traditional or collaborative in nature, and in printed or online format. An examination of the bibliographies of available 2007 and 2008 PhD dissertations from the University of Auckland has found citations to encyclopaedias make up a very small ( $n = 23$ , or 0.1% in 2007;  $n = 62$ , or 0.3% in 2008) proportion of total citations. Of the citations to encyclopaedias, the Arts and Science faculties each received the highest number of citations ( $n = 27$  and 26 respectively), with the disciplines English ( $n = 17$ ) and Statistics ( $n = 13$ ) receiving the most citations. The use of specialised ( $n = 19$ ) outnumbered general ( $n = 8$ ) encyclopaedias; and printed format encyclopaedias ( $n = 23$ ) were used more often than in online ( $n = 6$ ) format. Traditional style encyclopaedias were more frequently (61%) used than collaborative (39%) style encyclopaedias such as Wikipedia and the Encyclopaedia of Philosophy of Education. Wikipedia, a general, collaborative, and on-line format encyclopaedia, received the highest ( $n = 32$ ) number of citations, from 11 dissertations or bibliographies.



As the results show, the very low rate of encyclopaedia citations indicates that the reasons for citing them cannot be attributed to direct relevance to the varied dissertation topics (compared to the very high rates of journal, monograph and conference papers/proceedings citations). The reasons are more likely to be due to citing original sources of background detail or history, and defining technical/scientific concepts (Garfield, 1996, pp. 451-452). This appears to be the case with citations to both specialised and general encyclopaedias; the Encyclopaedia of Modern Australia and New Zealand, Encyclopaedia Britannica, Te Ara Encyclopaedia of New Zealand, Encyclopaedia of New Zealand, and occasionally Wikipedia were cited for historical details referenced in dissertations in English, History, and Political Studies. The use of most encyclopaedias in print format is most likely because they are published in print form only, although as mentioned above, there are a few printed encyclopaedias such as the Encyclopedia of Life Sciences (Wiley-Blackwell, 1999), Encyclopedia of Missions (Making of America, 2005), Encyclopedia of Networking and Telecommunications (Sheldon, 2001) and the Encyclopedia of New Zealand (Te Ara, 1966) which are also available online. Citations to encyclopaedia in on-line format appear to have been made either because it was the only format available, for example in the cases of Encarta Online Encyclopedia (defunct as of 31 October 2009 (Physorg, March 30, 2009)), Wikipedia, Te Ara Encyclopedia of New Zealand (Culture and Heritage Ministry, 2010), and the Encyclopedia of Philosophy of Education (2010); or due to the accessibility of the format, as revealed by citations to the online versions of Encyclopaedia Britannica, and the Encyclopedia of New Zealand (Te Ara, 1966). That the results show traditional style encyclopaedias were mainly cited is perhaps unsurprising as Table 7 shows, there are more encyclopaedias where articles are written by (named) subject experts than collaborative encyclopaedias which are a relatively recent development requiring time to establish a

reputation for 'credibility' and 'quality control' (Maron & Smith, 2009, Summary of findings) before being accepted in academic research.

The relatively high use ( $n = 32$ ; or 37.6% of encyclopaedia citations) of Wikipedia (as outlined in Table 8 above) could be attributed to reasons such as accessibility (for clarifying concepts, definitions), unavailability of other sources (Table 8 shows it has used for citing historical texts out of print and copyright) and possibly currency of information, given the higher usage in Science faculty dissertations. The collaborative style of Wikipedia may have an advantage over other resources in that changes or developments in technology can be quickly incorporated into its online pages by enthusiasts.

The proposed reasons for the citation of encyclopaedias as outlined above, citing original sources of background detail or history, and defining technical/scientific concepts (Garfield, 1996, pp. 451-452), pragmatism due to format, style and content availability, accessibility, and currency of information, is best defined by the 'multi-dimensional' (Camacho-Minano & Nunez-Nickel, 2009, p. 755) theory of citation behaviour. The theory combines the normative (Garfield, 1996, pp. 451-452) and social constructivist (Gilbert, 1977; Kaplan, 1965; Thorne, 1977; Van Raan, 1998) theories of citation behaviour together with more specific and pragmatic reasons such as physical accessibility (Liu, 1997). The author anonymity characteristic of Wikipedia does not fit the social constructivist theory with its emphasis on 'social', 'reward' and 'persuasion' (Gilbert, 1977; Kaplan, 1965, pp. 115 - 117; p. 181) reasons as they are reliant on knowing the cited author's identity.

The bibliometric 'laws' of the Matthew effect (Merton, 1968, pp. 56-63), publication bias (Beck & Manuel, 2008, p. 187), Lotka's Law (Hertzal, 2003, pp. 303 - 306), and Bradford's Law (Hertzal, 2003, pp. 306 - 311), as described above in *2.1 Approaches to citation analysis*,

cannot in reality be applied to the analysis of encyclopaedia citations in this study as the Matthew effect, which states well known authors are cited more often than less recognised authors in the same field regardless of source accessibility (Beck & Manuel, 2008, p. 187) would attempt to identify this trend in a single discipline of study, and one of the parameters of this study is to examine encyclopaedia citations in any discipline.

Furthermore, this study did not examine the detailed level of authors of articles, which would be required for an application of the Matthew effect. Similarly, Lotka's Law, which deems a small proportion of authors produce the bulk of publications in a field of study (Borgman & Furner, 2002, p. 49) and are therefore cited more often, is more applicable to studying authors in a specific discipline, unlike this study, which is providing a initial assessment of the role of encyclopaedias in academic research in New Zealand by measuring their citations in all disciplines in a sample of PhD dissertations. Likewise, publication bias analysis of articles to determine if positive and significant research is more likely to be published (Beck & Manuel, 2008, p. 187) would entail studying articles' texts, which is not an objective of this study but could be included as part of a study of encyclopaedias that contain primary research. Bradford's Law, which relates to a journal publishing trend that a small number of journals in a field of study tends to publish approximately a third of all articles, thereby influencing citation and library holdings decisions (Beck & Manuel, 2008, p. 188), also is not applicable to achieving the objectives of this study, which is to discover if citations to encyclopaedias occur in any field of study and the format of the encyclopaedias used; Bradford's law would be useful in a study analysing the use of encyclopaedias in a specific field.

This study has found that collaborative encyclopaedias, namely, the Encyclopaedia of Philosophy of Education and Wikipedia, are cited in PhD dissertations in New Zealand, although it constitutes a very small proportion of all citations, 7 of 22,760 citations in 2007 or 0.03%; 26 of 20,309 citations in 2008 or 0.13%). The total number of authors of these dissertations is 13, or 8.8% of a total of 147 dissertations. The number of individual authors ( $n = 11$ ) citing Wikipedia remains small as a proportion of the total, comprising 7.4% of 147 dissertations.

The Encyclopaedia of Philosophy of Education states it welcomes anyone to contribute articles and alternative views to its website, but has a peer review process ("Adding your entry," 2010) along with named editors who are well known in the study field, thereby removing the contentious issue of the anonymity of article authors and editors. In other traits then, the internet-based Encyclopaedia of Philosophy of Education is a traditional-style encyclopaedia compared to Wikipedia.

With the possible reasons (as discussed above) for citing Wikipedia being accessibility, unavailability of other sources, and information currency, the concerns (Gorman, 2007; Santana & Woods, 2009a; Svoboda, 2006; Waters, 2007) regarding the difficulty of verifying the accuracy and reliability of information from Wikipedia appear to be reasonable, based on its 'wiki' style which permits new articles and changes to existing articles to be made with relative anonymity, and without authoritative references. Unavailability of other sources, such as for ancient theological texts, may mean that an unsuccessful search for other sources has been made, citing Wikipedia in this instance is therefore necessary, but the original source could still be referenced (if available), as recommended by Wikipedia itself ("Citing Wikipedia," 2010, para. 1). Accessibility could be interpreted as other sources

for the information have been found, but the user-friendliness of Wikipedia influenced the choice of citation source. However, it could also mean the convenience of access to Wikipedia (and perhaps time constraints) were factors in the choice of reference source for (for example) definitions of concepts. Information currency is a valid reason for citing Wikipedia as discussed earlier, that contributors are able to quickly update changes in information to web pages, but although Nielson (2007, abstract) found scientific citations to Wikipedia to be generally reliable, it is assumed that PhD candidates are sufficiently experienced in their field of study to be able to verify information found in Wikipedia with other sources. This assumption is challenged by Biele et al. 's (2004) study that examined "appropriateness, or fit of the material type to the topic" (p. 351) as one of its criteria in examining dissertations and found "...the presumed quality of dissertation citations was not substantiated" (p. 352). Wikipedia itself warns that solely citing encyclopaedias is regarded unfavourably, that its "articles should be used for background information, as a reference for correct terminology and search terms, and as a starting point for further research" and to confirm its content with other sources ("Cite: Important note," 2010; Citing Wikipedia," 2010). As the majority of the citations to Wikipedia (27 of 32) as listed in Table 8 appear to be for defining concepts and terms, this could be seen as an appropriate usage of Wikipedia. However, with the widely known concerns expressed about the suitability of citing Wikipedia at any level of academic research, it is still surprising that this study found (albeit small) a measurable level of citations to Wikipedia in a sample of PhD dissertations in New Zealand.

The results of this study may be useful to university librarians and faculties in training students before they begin research for higher degrees.

## ***6.1 Suggestions for future research:***

As stated earlier, this study is intended as a preliminary quantitative analysis of encyclopaedia citations in New Zealand PhD dissertations; it is hoped that this study will stimulate future in-depth investigation in this field. A number of suggestions for future research that have arisen during this study are: of those that have cited encyclopaedias, how many are of quotations, rather than just sources of ideas? Considering the reasons why the extent of encyclopaedia citations is particularly high in some disciplines or low in others is another proposal. For example, if the extent of citations is particularly low in some disciplines, the likely reasons may be due to the unavailability or inaccessibility of specialized encyclopaedias or lack of relevance to the topic. Conversely, if the encyclopaedia citation rate is relatively high in a discipline, this may be due to an encyclopaedia containing primary research articles which have been cited as background material, or high numbers of specialised encyclopaedias in technical disciplines such as engineering. Or, ultimately, the reason could be due to differing levels of information literacy between students from diverse disciplines of study.

As mentioned in the limitations section above, lower levels of academic research such as Master's theses and postgraduate research papers and reports may reveal higher levels of encyclopaedia citations, producing different results from this study.

A final suggestion is a qualitative study surveying authors who have cited encyclopaedias could provide interesting data on this topic about why (or not) encyclopaedia citations have been made. In particular, qualitative research as a follow-up on Lim's (2009) survey result that approximately a third of respondents used Wikipedia but not for "finding articles or references or for conducting research" (Lim, 2009, p. 2195) may shed some light on why

people use Wikipedia, their reasons for choosing to cite it, and if verification of information is made.

## 7. APPENDIX A: Project Coding Sheet

Sample ID	Discipline	Journal	Book/Mor	Govt Docs	Website	Newspaper	Theses/Di	Conf Pap	Aud/Visu	Primary sc	Dict/Biog/ Other	Encyclopa	E. Format	E. Format	Collab. E	Trad.E	E. Title		
2007													O/L	Print					
1	BioSci	408	3	0	0	0	0	20	0	0	0	0	0	0	0	0			
2	Law	219	634	54	0	0	0	1	0	0	0	7	0	0	0	0			
3	Psych	117	125	3	1	0	1	1	0	0	0	0	0	0	0	0			
4	InfoSysOp	93	118	6	6	1	1	2	2	0	0	2	0	0	0	0			
5	Theology	60	160	0	2	1	2	2	0	1	0	0	0	0	0	0			
6	Psych	201	68	0	0	0	5	7	1	0	0	0	0	0	0	0			
7	Educate	69	217	40	0	0	7	13	1	1	2	3	1	0	1	0	1 E.NZ		
8	Psych	173	50	3	0	0	0	2	0	0	0	3	0	0	0	0			
9	BioSci	186	36	0	0	0	2	3	0	0	0	0	0	0	0	0			
10	EngEE	26	38	0	0	0	1	30	0	0	0	0	0	0	0	0			
11	Medicine/	521	4	0	0	0	0	0	0	0	0	0	0	0	0	0			
12	EngCivl	19	35	5	0	0	2	23	0	0	0	0	0	0	0	0			
13	Psych	297	423	0	0	1	3	11	0	0	1	0	0	0	0	0			
14	Psych	134	192	15	0	0	19	18	1	0	3	5	0	0	0	0			
15	Psych	282	105	0	4	0	2	12	0	0	1	0	1	0	1	0	1 E. Psychological Assessment		
16	Psych	225	11	0	0	0	0	5	0	0	0	0	0	0	0	0			
17	Medicine/	394	8	2	0	0	0	2	0	0	0	0	0	0	0	0			
18	Nursing	135	160	17	3	3	2	33	0	0	0	7	0	0	0	0			
19	Nursing	170	95	55	1	4	3	0	0	0	0	2	1	1	0	1	0 Wikipedia		
20	Medicine/	119	1	0	3	0	0	1	0	0	0	0	0	0	0	0			
21	Medicine/	436	59	2	0	0	5	3	0	0	2	0	0	0	0	0			
22	BiologSci	251	12	0	0	0	0	1	0	0	0	3	0	0	0	0			
23	Medicine/	248	6	0	0	0	0	2	0	0	0	0	0	0	0	0			
24	BiologSci	156	6	0	0	0	0	11	0	0	0	0	0	0	0	0			
24	BiologSci	300	119	1	0	1	6	15	0	0	0	1	0	0	0	0			
26	BiologSci	249	3	0	0	0	0	5	0	0	0	0	0	0	0	0			
27	BiologSci	335	70	0	0	0	11	24	0	0	0	6	0	0	0	0			
28	Medicine/	460	2	0	0	0	0	27	0	0	0	0	0	0	0	0			
29	Medicine/	423	37	19	0	0	0	2	0	0	0	1	0	0	0	0			
30	Bioengine	47	22	0	0	0	10	5	1	0	0	1	0	0	0	0			
31	Psych	179	10	0	0	0	0	5	0	0	0	0	0	0	0	0			
32	Medicine/	283	4	0	0	0	0	33	0	0	0	0	0	0	0	0			
33	InfoSysOp	177	63	11	0	2	0	7	1	1	0	0	0	0	0	0			
34	Statistics	74	32	0	0	0	2	3	2	0	0	5	0	0	0	0			
35	Anthropol	73	133	11	0	24	5	10	0	0	1	0	0	0	0	0			
36	Anthropol	209	407	0	0	4	17	9	1	12	0	6	1	0	1	0	1 Collector's E. Of Shells		
37	Anthropol	39	123	9	0	2	2	1	0	0	1	1	0	0	0	0			
38	Anthropol	30	214	1	0	20	1	0	0	0	0	2	0	0	0	0			
39	PolSci	80	245	10	17	71	8	9	0	0	0	1	1	0	1	0	1 Britannica		
40	Economic	143	127	9	9	0	1	9	0	0	0	1	0	0	0	0			
41	CompSci	63	23	0	0	0	8	86	0	0	0	5	0	0	0	0			
42	Developm	197	256	32	1	4	0	5	2	0	5	4	1	1	0	0	1 Britannica		
43	Educate	67	225	6	0	6	12	5	0	7	0	1	0	0	0	0			
44	Educate	43	109	26	0	2	11	21	1	0	1	1	0	0	0	0			
45	Educate/S	156	130	0	0	0	1	6	0	0	0	0	0	0	0	0			
46	Education	53	107	53	0	2	0	25	0	0	0	17	0	0	0	0			
47	Psych	169	70	2	0	1	3	9	0	0	0	1	1	0	1	0	1 EofLanguage&Education		
48	Translatio	83	140	1	1	1	4	0	0	1	3	2	0	0	0	0			
49	Theology	88	162	2	0	1	1	3	0	0	0	5	1	1	0	1	0 Wikipedia		
50	Theology	293	562	2	0	37	2	7	18	0	2	3	0	0	0	0			
51	Maori Stui	20	79	2	0	0	3	2	0	4	4	0	0	0	0	0			
52	AppLangS	156	201	7	0	1	29	3	0	0	5	2	1	0	1	0	1 EofLanguage&Education		
53	Geographi	303	176	17	0	6	15	10	0	5	1	9	1	0	1	0	1 SocialScienceE.		
54	Geographi	238	275	20	1	12	5	7	8	46	6	4	0	0	0	0			
55	Linguistics	80	97	0	0	0	4	3	0	0	0	1	6	0	6	0	6 EofLanguage&Linguistics		
56	Film	26	97	0	0	12	1	0	2	0	1	0	0	0	0	0			
57	History	73	182	39	0	14	46	5	1	166	3	1	0	0	0	0			
58	InfoSysOp	104	32	0	2	1	4	12	0	0	0	1	0	0	0	0			
59	FoodScier	102	29	0	0	0	3	7	0	2	0	3	0	0	0	0			
60	ForensiCS	208	30	0	0	0	4	3	0	0	0	1	0	0	0	0			
61	Chemistry	299	44	0	0	2	0	0	0	0	2	1	0	0	0	0			
62	InfoSysOp	65	45	0	0	0	8	58	0	0	0	3	1	0	1	0	1 Networking&Telecommunicati		
63	Sci/Enviro	222	42	0	0	1	0	0	0	7	0	1	0	0	0	0			
64	Eng(SW)	59	62	0	0	1	0	36	0	1	7	1	6	5	1	5	1 EofSWEng/Wikipedia		
65	EngEE	39	18	0	0	0	1	26	0	0	0	0	0	0	0	0			
66	EngEE	22	36	0	15	0	1	69	0	0	0	10	0	0	0	0			
67	EngEE	56	14	0	0	0	8	36	0	0	0	3	0	0	0	0			
68	Eng	78	23	0	0	0	3	14	0	0	0	3	0	0	0	0			
69	EngCivIE	35	21	0	0	0	1	7	0	0	0	2	0	0	0	0			
70	EngECom	25	21	0	24	0	0	114	0	0	0	0	0	0	0	0			
71	Arch/Plan	168	451	85	3	32	9	49	2	25	1	43	0	0	0	0			
72	BioSci	216	64	10	0	0	0	11	0	0	0	2	0	0	0	0			
73	EngEE	35	21	0	0	0	1	21	0	0	0	0	0	0	0	0			
2007 Totals		11881	8021	577	93	270	306	1027	44	279	52	187	23	8	15	7	16		



Sample ID	Discipline	Journal	Book/Mor	Govt Docs	Website	Newspap	Theses/Di	Conf Pap	Aud/Visu	Primary sc	Dict/Biog/	Other	Encyclopa	E. Format	E. Format	Collab.	E. Trad.E	E. Title				
2008																						
2008-1	Philosoph	4	204	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0				
2008-2	Theology	63	206	0	7	0	1	0	0	2	7	0	5	3	2	3		2	EofEarlyChristianity:Wikipedia			
2008-3	English	134	270	0	0	1	4	5	0	0	0	0	0	0	0	0	0	0				
2008-4	English	132	624	23	4	56	3	14	33	125	28	93	17	9	8	2		15	TeAra,Cyclopedia,PLiterature:Wikipedia			
2008-5	French	54	251	0	8	3	0	0	2	0	14	9	2	2	0	2		0	Wikipedia			
2008-6	French	19	222	0	0	0	6	0	0	0	0	0	1	0	1	0		1	IllEofMaoriMyth&Legend			
2008-7	PolSci	35	106	73	3	9	1	6	0	22	0	39	0	0	0	0	0	0				
2008-8	PolSci	61	226	31	6	24	8	3	5	0	1	33	0	0	0	0	0	0				
2008-9	PolSci	84	217	17	4	44	0	1	3	0	0	14	2	2	0	1		1	Wikipedia/TeAra			
2008-10	History	313	133	14	0	36	30	4	0	211	2	1	2	0	2	0		2	CompanEofHistoryofMedicine			
2008-11	History	44	147	8	5	12	39	4	0	311	0	4	1	1	0	0		1	TeAra			
2008-12	Education	38	192	11	0	2	0	1	0	0	1	0	0	0	0	0	0	0				
2008-13	Education	117	90	4	0	0	0	8	0	0	0	2	0	0	0	0	0	0				
2008-14	Education	167	55	0	0	0	1	22	0	0	0	5	0	0	0	0	0	0				
2008-15	Linguistics	32	175	0	1	0	0	7	0	0	2	0	0	0	0	0	0	0				
2008-16	Education	201	245	10	0	1	16	55	2	0	0	3	0	0	0	0	0	0				
2008-17	Education	170	147	8	0	0	4	6	0	0	0	1	0	0	0	0	0	0				
2008-18	Developm	48	148	10	0	8	10	19	0	1	0	1	0	0	0	0	0	0				
2008-19	Sci/Enviro	207	106	24	1	1	4	5	0	0	0	14	0	0	0	0	0	0				
2008-20	Geograph	61	160	2	1	5	10	17	0	0	1	6	0	0	0	0	0	0				
2008-21	Developm	139	285	3	0	0	1	4	0	0	0	3	0	0	0	0	0	0				
2008-22	Eng/Chem	99	19	0	1	0	0	3	0	0	0	2	0	0	0	0	0	0				
2008-23	Eng/Elect	73	20	0	0	0	1	29	0	0	0	0	0	0	0	0	0	0				
2008-24	Chemistry	112	6	0	1	0	2	0	0	2	0	3	0	0	0	0	0	0				
2008-25	Eng/Elect	21	10	0	0	0	0	27	0	0	0	6	0	0	0	0	0	0				
2008-26	Eng	100	42	0	0	0	0	4	0	0	0	6	0	0	0	0	0	0				
2008-27	Chemistry	282	29	0	1	0	3	9	1	3	0	4	0	0	0	0	0	0				
2008-28	Eng/Mech	24	13	0	1	0	6	1	1	0	0	0	2	2	0	2		0	Wikipedia			
2008-29	Eng	2	69	1	0	0	3	18	1	0	0	2	0	0	0	0	0	0				
2008-30	Eng	79	19	0	0	0	1	11	0	0	0	3	0	0	0	0	0	0				
2008-31	Eng/EE	16	10	0	11	0	0	44	0	0	0	0	1	1	0	1		0	Wikipedia			
2008-32	Eng/Comp	31	10	0	2	0	0	17	0	0	0	0	0	0	0	0	0	0				
2008-33	Eng	130	21	0	2	0	4	6	0	0	0	0	0	0	0	0	0	0				
2008-34	Psycholog	208	53	0	0	0	3	8	0	0	0	1	0	0	0	0	0	0				
2008-35	Psycholog	110	92	6	1	0	6	4	1	0	1	3	0	0	0	0	0	0				
2008-36	Planning/I	48	106	16	0	4	2	4	0	0	0	4	0	0	0	0	0	0				
2008-37	Medicine/	109	63	6	0	1	3	1	0	0	0	1	1	1	0	0		1	TeAra			
2008-38	Marketing	243	67	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0				
2008-39	Sociology/	167	228	9	0	19	6	27	0	0	1	13	2	1	1	1		1	EofPhilosophyofEduc/EofCreat			
2008-40	Pharmaco	193	16	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0				
2008-41	Medicine/	143	11	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0				
2008-42	Eng/Bioer	102	12	0	0	0	1	8	0	0	0	32	0	0	0	0	0	0				
2008-43	Medicine/	92	77	5	1	2	0	0	0	0	9	0	0	0	0	0	0	0				
2008-44	Medicine/	388	173	9	0	6	15	7	0	0	4	3	0	0	0	0	0	0				
2008-45	Medicine/	184	3	0	0	0	0	4	0	0	0	1	0	0	0	0	0	0				
2008-46	Medicine/	247	45	16	0	0	1	3	0	7	0	6	0	0	0	0	0	0				
2008-47	Psycholog	319	3	0	0	0	0	14	0	0	0	1	0	0	0	0	0	0				
2008-48	Science/C	378	27	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0				
2008-49	Science/C	112	115	9	0	1	0	12	0	0	0	0	0	0	0	0	0	0				
2008-50	Science/C	35	23	0	13	1	7	36	1	0	0	3	2	2	0	2		0	Wikipedia			
2008-51	Science/C	69	61	0	3	0	0	83	0	0	0	13	0	0	0	0	0	0				
2008-52	Science/I	84	14	0	0	0	3	6	0	0	0	1	0	0	0	0	0	0				
2008-53	Education	39	55	0	1	0	0	34	0	0	0	0	0	0	0	0	0	0				
2008-54	Science/S	104	21	0	0	0	0	5	0	0	0	2	1	0	1	0		1	EofLifeSciences			
2008-55	Science/Fi	172	42	0	7	0	1	10	0	0	0	3	0	0	0	0	0	0				
2008-56	Scienc/St	134	29	0	8	0	1	12	0	0	3	9	12	0	12	0		0	Wikipedia			
2008-57	Science/P	113	5	0	0	0	2	35	0	0	0	4	0	0	0	0	0	0				
2008-58	Science/P	57	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
2008-59	Science/C	65	15	0	0	0	0	3	0	0	0	3	0	0	0	0	0	0				
2008-60	Science/B	167	45	2	0	0	2	68	0	0	0	1	7	0	7	0		7	EofMarineMammals			
2008-61	Science/B	365	40	0	0	0	2	10	0	0	0	3	0	0	0	0	0	0				
2008-62	Science/B	196	6	0	0	0	0	2	0	0	0	3	0	0	0	0	0	0				
2008-63	Science/C	34	29	0	0	0	0	36	0	0	0	1	0	0	0	0	0	0				
2008-64	Science/B	312	41	8	0	5	4	6	0	0	0	0	0	0	0	0	0	0				
2008-65	Science/B	314	10	1	0	1	0	6	0	0	0	0	1	0	1	0		1	EofNutritionalSupplements			
2008-66	Science/B	478	6	0	0	0	0	7	0	0	0	1	0	0	0	0	0	0				
2008-67	Medicine/	424	5	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0				
2008-68	Science/B	201	10	0	0	0	1	19	0	0	0	3	0	0	0	0	0	0				
2008-69	Science/B	261	5	0	0	1	0	8	0	0	0	4	0	0	0	0	0	0				
2008-70	Science/B	210	12	0	0	0	0	27	0	0	0	3	0	0	0	0	0	0				
2008-71	Science/B	210	76	1	0	0	1	9	0	0	0	1	0	0	0	0	0	0				
2008-72	Science/B	231	73	0	0	0	16	21	0	0	0	0	3	0	3	0		3	EofMarineMammals			
2008-73	Science/C	469	11	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0				
2008-74	Eng/CivilE	101	41	2	1	0	2	8	0	0	0	0	0	0	0	0	0	0				
2008 Totals		10980	6264	330	95	244	240	903	50	684	78	379	62	36	26	26	36					
Cumulative totals		22861	14285	907	188	514	546	1930	94	963	130	566	85	44	41	33	52					

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