

A Bibliometric Analysis of the Theses and Dissertations on Information Literacy Published in the United States and Taiwan

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Abstract. The purpose of this study is to explore the characteristics of the theses and dissertations on information literacy from 1988 to 2010 in the United States and Taiwan, such as publishing universities, paper growth, author/advisor productivity, type of literacy, and research methods. The comparison of theses and dissertations on information literacy research is made between those completed in the United States and Taiwan. This study investigates and maps the trends in information literacy research by applying bibliometric analysis to the 767 theses and dissertations in the field of information literacy in the United States and Taiwan. The study reveals that theses and dissertations on information literacy in Taiwan grew rapidly (502, 65.45%) and more were published than in the United States (265, 34.55%), although the first doctoral dissertation published in the United States was in 1988 while the first master thesis published in Taiwan was in 1996. The rates at which they dealt with information literacy, media literacy, and digital literacy were respectively 54.57%, 30.59%, and 14.84%, there are significant differences between the United States and Taiwan in the three types of literacy research. Furthermore, the type of methodology implemented in theses and dissertations in the United States is different from that used in Taiwan.

Keywords: information literacy, media literacy, digital literacy, United States, Taiwan.

1 Introduction

As the information society has been approaching in the twentieth century, faced with highly- developed computer and communication technology, and the information explosion, people encounter the difficulties of how to find information to solve

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problems. On the other hand, higher education is also seeking to reform, coupled with the promotion of the concept of lifelong education and learning, and so has contributed to the information literacy research. (Wang, et al., 2012) In 1989, the American Library Association first proposed the important document entitled "The American Library Association Presidential Committee on Information Literacy Final Report," in which it advocated that every person and organization should be information literate. Subsequently, in the United Kingdom, Australia, Europe, and Taiwan, as well as many countries, a variety of projects and activities related to information literacy were held, including seminars, research projects, and related curricula. (American Library Association, 1989)

The definition of information literacy developed by the American Library Association is the ability to "recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information." (American Library Association, 2012) The ERIC (Education Resources Information Center) Database defines information literacy as "the ability to access, evaluate, and use information from a variety of sources." (ERIC, 1992) According to these definitions, one could conclude that information-literate people are those who are in possession of the necessary knowledge, skills, and attitudes to apply information technology effectively to collect, analyze, assess, organize and synthesize information for solving problems encountered in their living and working needs.

Information literacy is a multifaceted dimensional concept, commonly referred to as "information skills." The terms related to information literacy in the ERIC database include access to information; computer literacy; information seeking; information skills; information utilization; librarian teacher cooperation; library instruction; library skills; multiple literacy; online searching; scientific literacy; search strategies; technological literacy; and users (information). (ERIC, 1992) McClure (1994) identified information literacy as "the ability to solve information problems is a high-level literacy covering four kinds of literacy, including traditional literacy in reading and writing, computer literacy, media literacy, and network literacy."

Information literacy research has developed since 1990, governments have promoted national information literacy competency via inclusion in national basic education policy through a variety of plans or policies in the UK, Australia, Canada, France, Spain, and Taiwan. Information literacy research with diverse and rich content covers exploring the definition and connotations of information literacy, how to cultivate information literacy, how to provide information literacy education and curricula, as well as various levels of information literacy competency such as those of primary and secondary school students, undergraduates, adults, workers, professionals, etc.

Bruce (2000) analyzed the literature on information literacy during 1980-2000 and found information literacy researchers beginning to develop a collective consciousness that represents the newly-appearing territory of information literacy research. This study divides information literacy research into four phases: precursor's period, experimental period, exploring period, and evolving period. In the precursor's period (1980s), information literacy research was to create a period when people explored information skills and bibliographic education. In the experimental period (1990-1995), many schools provided information literacy education and discussed research

issues. The United Kingdom and Australia also began to study information literacy. In the exploring period (1990-1995), information literacy research was marked by the identification and exploration of different paradigms for information literacy research, and the offering of multiple research agendas. While most research was conducted within, and for, the educational sector, interest in workplace-based research began to emerge. In the evolving period (since 2000), information literacy research has come to include the development of a community of researchers and research teams; growth in research beyond the educational sector, particularly in the workplace and community; attention has been paid to a wider variation of cultural settings.

In 1993, T. C. Lee of the National Taiwan University, and G. Wang and S. T. Wu, of the National Cheng-Chi University, started to undertake fundamental study on information literacy from different research approaches with funding support from the National Science Council of Taiwan, the former from the perspective of library science, and the latter from the perspective of media communication. (Lee, 1994; Wang & Wu, 1994). Since 2001, the number of Internet users in Taiwan has grown rapidly, people using the Internet have become younger, under such circumstances, information literacy gradually received attention. Many discussions were held regarding the information literacy competency of IT teachers, IT researchers, librarians, and university faculty (Chuang, 2009). As the trend of network development emerged in Taiwan, many universities, libraries, departments and institutes of Information Science, Education, Information Management, Business Administration, Mass Communication, Information and Communication began to engage in information literacy research. So far, Taiwan's information literacy research has developed for more than ten years, but the lack of review research represents a gap in information literacy. The study mainly explores information literacy research in the United States and Taiwan with bibliometric analysis of theses and dissertation during 1988-2010.

The purpose of this study is to explore the characteristics of the theses and dissertations on information literacy, such as publishing universities, literature growth and author/advisor productivity, type of literacy, and research methods. The comparison of theses and dissertations on information literacy research is made between those published in the United States and Taiwan, in addition, a detailed analysis and comparison of information literacy, media literacy, and digital literacy between the two countries is also proposed. This topic was identified as being of importance to cultivate information-literate citizens and to promote information literacy research in the Internet age.

2 Method

This study, based on the above concept of information literacy, concludes that an information literacy model should include (1) information literacy: skills for acquiring, analyzing, organizing, and evaluating information; (2) digital literacy: the ability of digitization and utilization of information resources; (3) media literacy: understanding the creation, analysis, and evaluation of media messages.

For the present work, the National Digital Library of Theses and Dissertations in Taiwan and the ProQuest Dissertations & Theses have been employed to retrieve bibliographic data of theses and dissertations on information literacy from 1988 to 2010. All of the master theses and doctoral dissertations on information literacy submitted to National Central Library in Taiwan were searched from the online database: The National Digital Library of Theses and Dissertation in Taiwan (NDLTD, 臺灣博碩士論文知識加值系統) from 1996 (the date of the first theses presented in the NDLTD) to 2010 were located and in total 502 theses were analyzed.

An international sample (N=265) of doctoral dissertations primarily from North America from 1988 to 2010 forms the second part of the material for this analysis. This sample was derived from a keyword search (for "information literacy" OR "digital literacy" OR "media literacy" OR "internet literacy" In Title, Subject, Keyword) in an online subscription database: ProQuest Dissertations & Theses (PQDT, most of the contents of which come from the United States and Canada). Titles and abstracts from the results of the initial search were examined in order to exclude results which were clearly unrelated to information literacy and theses/dissertations for which abstracts were not provided.

3 Results

3.1 The Growth of Theses/Dissertations on Information Literacy Production

The most important finding of this research is that Taiwan (which has published 502 theses/dissertations, 65.45%) published more theses/dissertations than United States (265, 34.55%) up to the date to which we carried out our study, although the first doctoral dissertation published in United States was in 1988 while the first master thesis published in Taiwan was in 1996. This research also reveals that the years when the most research was submitted were 2008 in United States, when 35 papers were submitted, and 2009 in Taiwan, when 61 papers were published. In Taiwan, two theses were prepared in 1996 but at doctoral degree level, no dissertations were prepared between the years of 1996-1999, and only seven doctoral dissertations were written on information literacy between 1996 and 2010.

It can be observed that a very big increase in terms of theses/dissertations published took place in both the United States and Taiwan during the years of 2000-2010. Figure 1 shows the evolution of production since 1988. There has been an ongoing increase in the number of theses/dissertations written on information literacy. From annual paper analysis, the development of theses/dissertations on information literacy in Taiwan can be divided into three stages. In the first stage, before the year 2000, less than 10 theses/dissertations were approved, at the second stage, 2001-2003, the number of papers increases from 10-40; after 2004, the number of papers remains higher than 40, showing a steady growth trend. Overall, the theses/dissertations growth rate is in a steadily up-growing trend since 2000 in the U.S. and in Taiwan.

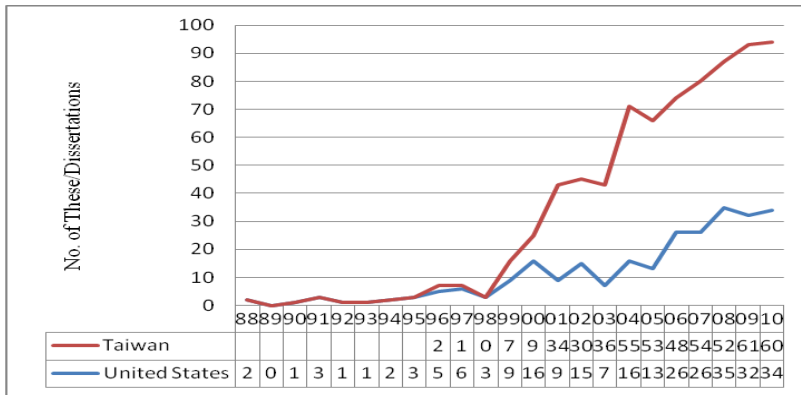


Fig. 1. Evolution of theses/dissertations on information literacy between 1988 and 2010

3.2 Some Bibliometric Characteristics of Theses/Dissertations on Information Literacy

The 265 theses and dissertations on information literacy in the United States come from 159 universities, additionally, the 502 theses and dissertations on information literacy in Taiwan come from 71 universities, as shown in Table 1.

Table 1. Theses/dissertation production of information literacy, 1988-2010

	Theses	Dissertation	Subtotal	Universities
United States	NA	265	265(34.55%)	159
Taiwan	495	7	502(65.45%)	71
Total	495	272	767	230

The 25 most productive universities are listed in Table 2. It should be noted that a university may be a single department/institute or may consist of several departments/institutes. Among them, there are 25 universities which have produced more than 91 dissertations on information literacy in the U.S. The Florida State University and University of Pittsburgh are the first locations for the submission of six dissertations on information literacy to PQDT respectively. Temple University and University of Massachusetts Amherst are the second, making up five dissertations respectively. Table 2 shows the universities which have registered more than three dissertations on information literacy in PQDT.

Table 3 lists the 16 most productive universities in Taiwan which have registered more than ten theses/dissertations on information literacy in Taiwan from 1996-2010. It should be noted that a university may be a single department/institute or may consist of several departments/institutes. The National Taiwan Normal University is the largest contributor, approving 29 theses/dissertations. The National Kaohsiung Normal University is the second-largest contributor, approving 26 theses/dissertations.

Table 2. The most productive universities of information literacy theses/dissertations in the U.S., 1988-2010

University	Dissertations	Percentage
The Florida State University	6	2.3
University of Pittsburgh	6	2.3
Temple University	5	1.9
University of Massachusetts Amherst	5	1.9
Capella University	4	1.5
Nova Southeastern University	4	1.5
The University of North Carolina at Chapel Hill	4	1.5
The University of Wisconsin - Madison	4	1.5
University of North Texas	4	1.5
University of Toronto (Canada)	4	1.5
Columbia University Teachers College	3	1.1
New York University	3	1.1
Oklahoma State University	3	1.1
State University of New York Empire State College	3	1.1
Syracuse University	3	1.1
The University of Alabama	3	1.1
The University of Iowa	3	1.1
The University of New Mexico	3	1.1
University of California, Los Angeles	3	1.1
University of Central Florida	3	1.1
University of Florida	3	1.1
University of Maryland, College Park	3	1.1
University of South Carolina	3	1.1
University of Virginia	3	1.1
Walden University	3	1.1

Table 3. Universities in Taiwan which have registered more than ten theses/dissertations on information literacy in Taiwan, 1996-2010

University	Theses/diss.	Percentage
National Taiwan Normal University	29	5.8
National Kaohsiung Normal University	26	5.2
National Taipei University of Education	24	4.8
National Changhua University of Education	23	4.6
National Chiayi University	22	4.4
National Chengchi University	20	4.0
National University of Tainan	19	3.8

Table 3. (continued)

Tamkang University	18	3.6
National Chung Cheng University	15	3.0
National Taichung University of Education	13	2.6
Shih Hsin University	12	2.4
National Pingtung University of Education	12	2.4
Taipei Municipal University of Education	11	2.2
Shu-Te University	11	2.2
Fu Jen Catholic University	10	2.0
National Taitung University	10	2.0

3.3 Advisor Productivity

There are 225 professors from 159 universities who have advised doctoral dissertations on information literacy in North America. Only nine professors have been the advisors of two doctoral dissertations, as shown in Table 4.

Table 4. Professors who have advised two doctoral dissertations written on information literacy in the U.S

Advisor	No. of dissertations
Austin, Erica Weintraub	2
Colvin, Carolyn	2
Cooks, Leda	2
Hill, Clifford	2
Hobbs, Renee	2
Ragsdale, Ronald	2
Schwarz, Gretchen	2
Truglio, Rosemarie	2
Yan, Wenfan	2

There are 356 professors who have advised theses/dissertations on information literacy in Taiwan. Table 5 shows there have been 15 advisors of at least four master theses/doctoral dissertations on information literacy in Taiwan. The most productive advisor is Professor Lin Jing (林菁) of National Chiayi University, who advised 14 papers. Regarding the schools with which these advisors were affiliated, most

Table 5. Professors who have advised more than four theses/dissertations written on information literacy in Taiwan

Advisor	University	No. of dissertations
Lin Ching Chen(林菁)	National Chiayi University(國立嘉義大學)	14
Yuanling Lai(賴苑玲)	National Taichung University of Education (國立臺中教育大學)	11
Jia-Rong Wen(溫嘉榮)	National Taichung University of Education (國立臺中教育大學)	10
Tao-Ming Chuang(莊道明)	Shih Hsin University(世新大學)	7
Tsuey Jen Wu(吳翠珍)	National Chengchi University(政治大學)	5
Chih-Lung Lin(林志隆)	National Pingtung University of Education (國立屏東教育大學)	5
Mei-Chun Yin(尹玫君)	National University of Tainan(國立臺南大學)	5
An-Kuo Chiang(蔣安國)	Fo Guang University(佛光大學)	4
Chang-bin Wang(王昌斌)	Nanhua University(南華大學)	4
Yau-Jane Chen(陳姚真)	National Chung Cheng University(國立中正大學)	4
Wen-Shyong Dai(戴文雄)	National Changhua University of Education (國立彰化師範大學)	4
Chia-Jung Lin(林佳蓉)	National Taipei University of Education(國立臺北教育大學)	4
Pao-Nuan Hsieh(謝寶媛)	National Taiwan University(國立臺灣大學)	4
Chao-chen Chen(陳昭珍)	National Taiwan Normal University(國立臺灣師範大學)	4
Hou-Long Yen(顏火龍)	National University of Tainan(臺南師範學院)	4

specialized in education, library and information science, management information systems and communication.

3.4 Distribution of Theses/Dissertations on Information Literacy, Media Literacy and Digital Literacy

In terms of all theses/dissertations ($n=767$), the percentage of those which dealt with information literacy, media literacy, and digital literacy was respectively 54.57%, 30.59%, and 14.84%. There are significant differences between the papers published in the United States and those published in Taiwan. The number of dissertations focusing on media literacy in the United States is slightly higher than those in Taiwan, but those theses/dissertations focusing on information literacy are dominant with a percentage of about 59%. Table 6 compares the difference of the distribution of three types of literacy between the United States and Taiwan. The distribution of theses/dissertations among the three type of literacy in the United States and in Taiwan is shown in Figure 2 and Figure 3.

Table 6. The distribution of theses/diss. on information literacy, media literacy and digital literacy in the U.S. and Taiwan

Type of literacy	United States	Taiwan	Total
information literacy	117 (44.2%)	361 (59.08%)	478 (54.57%)
media literacy	126 (47.5%)	142 (23.24%)	268(30.59%)
digital literacy	22 (8.3%)	108 (17.68%)	130(14.84%)
Total	265	611*	876

*Among the total of 502 literacy research papers in Taiwan, there are 99 papers whose research subject covers two or more literacies.

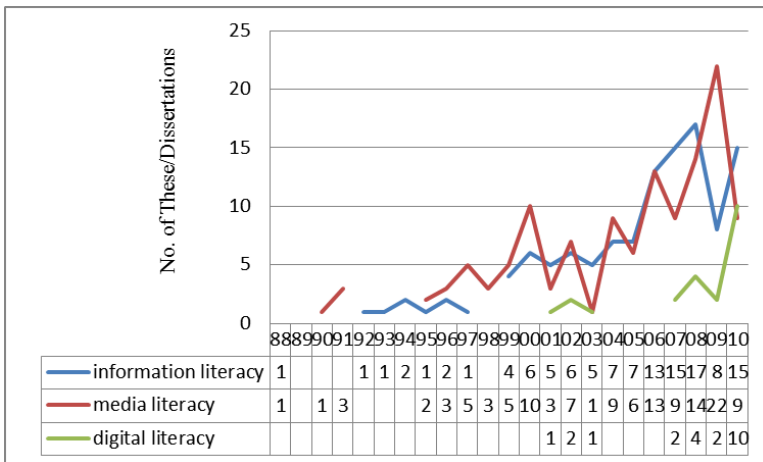


Fig. 2. The distribution of theses/dissertations between three types of literacy in the United States

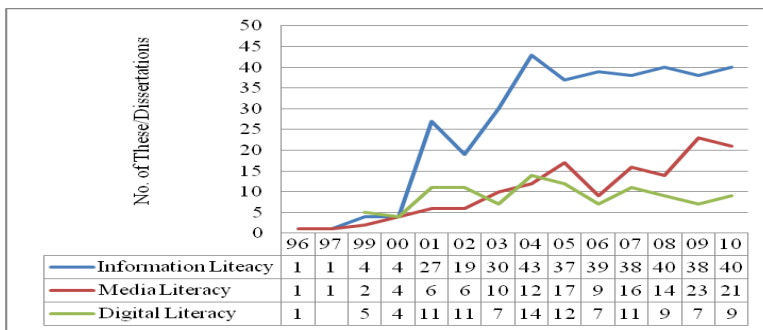


Fig. 3. The distribution of theses/dissertations between three types of literacy in Taiwan

3.5 Research Method Adopted by Theses/Dissertations on Information Literacy

In analyzing the type of methodology implemented in theses/dissertations, there are significant differences between the United States and Taiwan, as shown in Table 7.

The majority of doctoral dissertations on information literacy in the United States used qualitative research designs (n=133, 50.2%), although quantitative designs (114, 43%) and mixed-method designs (18, 6.8%) were also used. Figure 4 shows the distribution of research methodology adopted by theses/dissertations on information literacy in the United States.

On the other hand, most of the master theses (and seven doctoral dissertations) on information literacy in Taiwan adopted quantitative research designs (431, 85.9%), and only 14.1% adopted qualitative research designs. Within the 431 quantitative theses/dissertations, survey research (384, 76.5%) appears to be the predominant method of inquiry. Furthermore, it appears that a minority of theses/dissertations used experimental and quasi-experimental designs (25, 5%) to investigate their research questions. Within the 71 qualitative research designs, there were 25 (5%) which used observation, 17 (3.4%) used interviews, and 11 (2.2%) used action research.

Mixed methods is defined as research in which the researcher collect and analyzes data, integrates the findings, and draws inferences using both qualitative and quantitative approaches or methods in a single study(Creswell, 2008). According to Creswell, mixed methods research has attracted substantial interest during the past 20 years. In our research, the first dissertation adopting mixed methods approach appeared in 1996, and the second dissertation with mixed methods arrived three years later.

In Taiwan, information literacy research is highly related to information education research, as well as extending to other disciplines including information technology, information management, library and information science, and communication studies. Regarding study themes, information literacy research has been guided by government policies, including those of the Ministry of Education, to promote IT education and media literacy education in elementary and junior high schools, and the Research and Development Committee, to promote the digital divide plan which contributes to a growing trend of information literacy research by year.

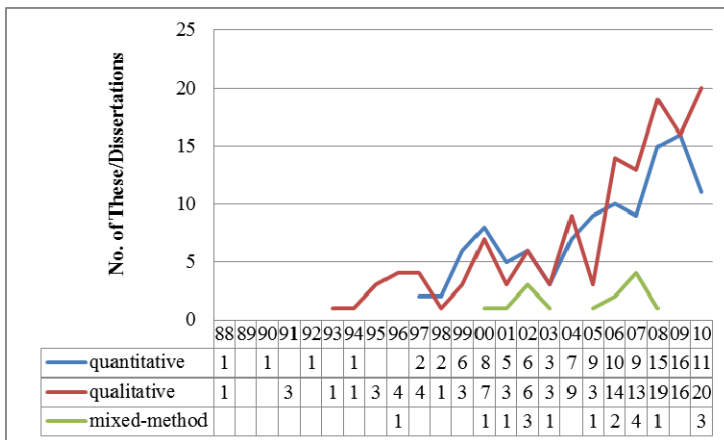


Fig. 4. The distribution of research method adopted by theses/dissertations on information literacy in the United States

Table 7. Methodology adopted by theses/dissertations written on information literacy

Research method	The United States				Taiwan			
	Information literacy	Media literacy	Digital literacy	Total	Information literacy	Media literacy	Digital literacy	Total
Qualitative research	43	80	11	133	40	29	2	71
Action research	4	10		14	4	6	1	11
Case study	15	21	4	40				
Comparative study		1		1				
Content analysis	3	9		12	1	4		5
Ethnographic study		6	1	7				
Grounded theory	2	2		4				
Interview	4	4		8	12	5		17
Literature review		1		1	8	3		11
Observation					13	11	1	25
Phenomenological study	2	3		5				
Qualitative research	11	17	6	34	2			
Rhetorical analysis		3		3				
Theoretical investigation	2	3		5				
Quantitative research	65	41	7	113	321	57	53	431
Experiment	13	26	1	40	14	9	2	25
Survey	48	15	6	69	306	47	51	404
Delphi study	4			4	1	1		2
Mixed-methods	9	5	4	18				
Total	117	126	22	265	361	86	55	502

4 Conclusions

The present work explores the characteristics of theses and dissertations on information literacy in the United States and Taiwan from 1988 to 2010 based on the databases of NDLTD and ProQuest Dissertations & Theses using bibliometric analysis. The study reveals that theses and dissertations on information literacy in Taiwan grew more rapidly (502, 65.45%) and were published more frequently than in the United States (265, 34.55%), although the first doctoral dissertation was published in the United States in 1988 while the first master thesis was published in Taiwan in

1996. The theses/dissertations growth rate has displayed a steadily up-growing trend since 2000 in the United States and in Taiwan.

The 265 theses and dissertations on information literacy in the United States come from 159 universities, furthermore, the 502 theses and dissertations on information literacy in Taiwan come from 71 universities. The most productive universities and advisors of theses and dissertations on information literacy in the United States and in Taiwan are identified.

In terms of all theses/dissertations, the rates at which information literacy, media literacy, and digital literacy are handled are respectively 54.57%, 30.59%, 14.84%, in addition, there are significant differences between the United States and Taiwan. There are more theses and dissertations on media literacy in the United States than in Taiwan, while there are more theses and dissertations on digital literacy in Taiwan than in the United States.

The present study also indicates that there are significant differences between the type of methodology implemented in theses and dissertations in Taiwan, and those implemented in the United States. The majority of doctoral dissertations on information literacy in the United States used qualitative research designs, while most of the master theses on information literacy in Taiwan adopted quantitative research designs and only 14.1% adopted qualitative research designs.

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