

教科書評鑑方法與系統—以資訊管理教科書為例

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摘要

教科書排序評鑑方法與系統，其主要係以運用博碩士論文與期刊論文的參考文獻之引用教科書狀況，以及教科書間的交叉引用，所設計出來的論文引用指數與引用排名報告來令使用者得知該教科書被引用度與評價高低；同時輔助採用圖書館借閱流通記錄、問卷調查與評比及教師採用教科書的整合型綜合指數，用以更清楚得知該教科書的評價狀況與被引用指數，同時亦能夠提供兩者之間的比較分析與效果驗證，使得排序評鑑方法與資訊系統的設計能更加完善精確，藉以有效提供教師、學生與圖書館員在篩選與選購教科書時的一種電腦輔助計量決策與推薦工具。

關鍵詞：教科書、評鑑、文獻計量

Textbook Assessment Method and System – The Example of Information Management Textbooks

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Abstract

For this study, we designed an assessment method and system for textbook ranking. The proposed approach mainly references master's and doctor's theses and the periodical papers which cite textbooks as well as references cited among textbooks themselves. The designed citing index and citing report may help scholars to better assess textbook quality and how often it is cited. The textbook circulation records in the library and a questionnaire for professors are also used in the composite index of the textbook assessment. This would help scholars more understand the quality of different textbooks. These methods offer more comparative analysis, and verify the results between them, and also allow the design of more accurate methods for evaluating and ranking information systems. The proposed method and system can also provide introduction tools and computerized auxiliary measures for teachers, students, and library staff when screening and buying textbooks.

Keywords: Textbook, Assessment, Bibliometrics

I. Introduction

Textbooks are important type of publications in the scholar community. Critical methodology and technology are described in textbooks. Teachers instruct students and share knowledge with them though textbook. However, there are so many textbooks so that it becomes difficult to know the quality for each textbook in a short period time. Therefore, it becomes the great challengeable job to proceed with textbook assessment analysis and design the effective evaluation index. Huang (2005) used interview and statistics methods to evaluate textbooks. Chen(2004) used Fuzzy and Delphi methods to evaluate textbooks by questionnaires. Bahir (2016) use t-Test to assess the readability level of commonly used primary six English textbook. Their methods cost much to collect data and analyze them. We use software system to process raw data. This would save more time and handle large scale of data easily.

In this study, one computer-aided bibliometrics system was designed to help evaluate the textbook and help the library stuffs to order high quality textbooks. This system can also help scholars or domain experts to select authoritative textbooks. There are several operation procedures for this system. First, the textbooks for specific domain are listed. Second, the references of doctor's and master's dissertation and the academic periodical thesis were collected and inserted into the database. Third, the textbook impact factor was calculated. At last, several alternative methods are also used. (1) The borrowing rate of library. (2) The questionnaire from professors' recommendation. (3) The cross cited rates between textbooks. It also can offer the users the searching information on related textbooks that they need. And it can generate the textbook ranking list.

1. Background explaining

In an era of knowledge economy now, the professional domain knowledge are expanded, accumulated and renovated rapidly. The classical research results and knowledge in the professional field are often recorded and included by the textbooks. Various kinds of field subjects in the department of university often have many related textbooks. The teachers, students, library staffs or general readers usually feel very difficult to select an authoritative textbook from the bookstore or the library.

Most bookstores often only offer top selling books list for readers, they don't offer all detail selling records for every book in store. In addition, although the internet book stores provide software system to let readers to rate books online, the rating results are not very reliable and trustable because too few persons to rate books.

Textbook ranking assessment method and system is one kind of computer technology to apply computer-aided bibliometric system to process the citing references of the master's and doctor's dissertations, periodical papers and textbooks in order to carry on textbook ranking and assessment. The borrowing book rate in the library, teacher questionnaire and lecture textbook usage rate as the comparative index to cross verify the results obtained from the textbook ranking and assessment system.

2. Motivation

In the academic community, people often use journal publication to evaluate scholars. Thomson ISI company constructs the WOS(web of science), Essential Science Indicator and Journal Citation Report database to help this assessment work. However, journal publication should be one of the evaluation methods. Textbook, conference, patent and competition award can also provide high impact to the world. For examples, Kao K. C. (1966) published one conference paper in 1966. He got the Nobel Prize in Physics in 2009 because of his conference paper. Therefore, journal should not the only solution to evaluate scholars.

Most classical theories are always recorded in textbook. Students spend lots of time to study textbook. Teachers also spend lots of time to study textbook in order to prepare the lecture notes. A good textbook has great

contribution to the scholars. That would help scholars to learn more in limited time. It can also save library budget to buy and collect core textbooks.

Therefore, one textbook ranking assessment system was designed in this study. It can effectively offer the teachers, students, and library stuffs a computer-aid decision tool while screening and choosing textbook.

3. Purpose

In this study, the system was designed to have the function of searching the books, including accordance with questionnaire recommendation, dissertation citing, the periodical citing and library circulation. The major system design concept was focus on offering the textbook's searching, indexing and ranking. General speaking, the information is changing and developing rapidly now, people can get much more new professional knowledge and technology easily. And the classic research and result in every professional field are always recorded and collected in the textbook. But many different textbooks with the similar book title were published by many different authors and publishers. Therefore, the teachers, students, or general readers will feel very difficult to choose the more authoritative textbook. The purposes of this system are as the following: (1) Help scholars to collect, search, and screen textbook's information. (2) Offer textbook's ranking and citation analyzing in order to choose high quality textbooks from numerous ones. (3) Propose ranking methods, such as Textbook citing each other, Journal citing textbook and Questionnaire recommendation and Library circulation. That's quite different from general bookstores' and on-line bookstores' ranking method. (4) This research offers more pluralistic ways in order to rank different textbook and cross verify different ranking method.

II. Related research

The related dissertations, patents and journal articles are collected, compared and analyzed as the following. The suitable variables could be used to evaluate textbook were also collected from different related papers.

1. Related dissertations

Related literatures are collected and compared as the following table 1. The research method, contribution, advantage and disadvantage are the properties to compare related works with this research.

Table 1 Related dissertations

| | Chen (2004) | Huang (2005) | Bahir (2016) | This Study |
|-----------------|--|---|---|---|
| Research Method | Fuzzy Method | Interview and Statistics | t-Test | Bibliometrics |
| Contribution | Combine Fuzzy and Delphi method to evaluate Textbook from Questionnaire. | Combine qualitative and quantitative research methods to understand how network rating affects procurement intention. | Assessed the readability level of commonly used primary six English textbook. | Design the Computer Aided Bibliometric System to rank Textbook. |
| Advantage | Peak data is removed. And, Fuzzy method is much close to human being's decision. | Double check and cross verify research results from quantitative and qualitative method. | Use t-Test to verify hypothesis. | Quantitative, automatic and large scale solution. |
| Disadvantage | Precision is lower. Sample is not easy to collect regularly. | Few people will spend time to do the online rating. | Sample size is small. | Data normalization cost is high. |

2. Related patents

Two related patents are found in Taiwan PTO and US PTO database. The valuation system and method of textbooks by mobile device (Kuo, 2006) is from Taiwan Patent database. This patent use the mobile communication device to let publisher, author and reader evaluate the textbooks by online testing. This approach is much close to the questionnaire method. Method and a system for personal and textbook knowledge management (Haifa, 2006) is from U.S.A. Patent database. The present invention is a new and efficient means for abstracting answers to questions from a given repository of data, which is either personal knowledge or a textbook. It provides the means for retrieving full answers for complex questions via a PDA-oriented, user friendly interface. Although its title has the term, “textbook”, it is not use to rank or assessment textbook. Both patents don’t have the same goal with this study.

3. The assessment variables for evaluating textbook quality

After we collected related academic articles, some textbook assessment variables from different theses and authors are found. And then, we make the cross-variable mapping table as the following table 2.

Table 2 The cross-variable mapping table from different textbook papers

| Variable | Author | Moyer & Mayer (1985) | Richaudeau (1986) | Yager (1989) | Armbruster (1985) | Jacob Chen & Joseph C. hen (2001-2002) |
|---|--------|-------------------------|----------------------|-----------------|----------------------|---|
| Whether the concept is knowing. | | ✓ | ✓ | ✓ | ✓ | ✓ |
| Whether can join the new or old concept together. | | ✓ | | ✓ | ✓ | |
| Add the resources / future direction. | | ✓ | | | | ✓ |
| Whether the new definition concept perfects and used. | | ✓ | | | | |
| Adequate sequence. | | ✓ | | | ✓ | ✓ |
| Whether can excite students' idea. | | ✓ | | ✓ | ✓ | |
| Include various kinds of concepts / life information. | | ✓ | | | | ✓ |
| The conclusion is has the evidence to put forward. | | ✓ | | | | |
| Whether the content method describes and quoted accurately. | | ✓ | | | | |
| expand student curiosity | | ✓ | | ✓ | ✓ | |
| Whether the content method describes and quoted accurately. | | | ✓ | | | |

(continued)

| Variable | Author | Moyer &Mayer (1985) | Richaudeau (1986) | Yager (1989) | Armbruster (1985) | JacobChen &Joseph C. hen (2001-2002) |
|---|--------|------------------------|----------------------|-----------------|----------------------|---|
| Suitable for bringing and educating students. | | | | √ | | |
| Content and approach appropriate for the under-represented and under-served. | | | | √ | | |
| Easy to read. | | | √ | √ | √ | √ |
| How science, technology, and society influence on each other. | | | | √ | | |
| The reading level of the text is in conjunction with the grade level of the students. | | | | √ | | √ |
| Up-to-date information. | | | | √ | | √ |
| Adequate programming exercises. | | | | | | √ |
| Adequate information of optimization. | | | | | | √ |
| Proper home work practices. | | | | | | √ |
| Adequate tables, figures and photos. | | | | | | √ |
| Fewer lengthy passages. | | | | | | √ |
| Adequate examples. | | | | | | √ |
| Explanation of relations to industrial practices. | | | | | | √ |

4. The relationship of the related theses

Using the Web of Science database from Thomson Reuters Company, the top three highly cited papers each year were selected. In Fig.1, the top 3 highly cited papers each year and their cited relationships were illustrated. For examples: Horsch, A, 2000, INT. J. MED. INFO (6, 8, 1, 0). This means that Horsch, A. submitted his article to International Journal of Medical Informatics in 2000. The number format for (6, 8, 1, 0) is (cited counts, citing counts, cited counts by Top 3 papers, citing counts to Top 3 papers). This paper was cited by six papers. And, it cites eight papers. It cites one highly cited Top 3 paper. It had never been cited before by any highly cited Top 3 papers. The arrow point direction, it means the citing relationship, not cited relationship. For example, in Fig.1 or Fig.2, Horsch, A, 2000, INT. J. MED. INFO. was citing the paper, Horsch, A, 1998, DECISION SCIENCES CONF.

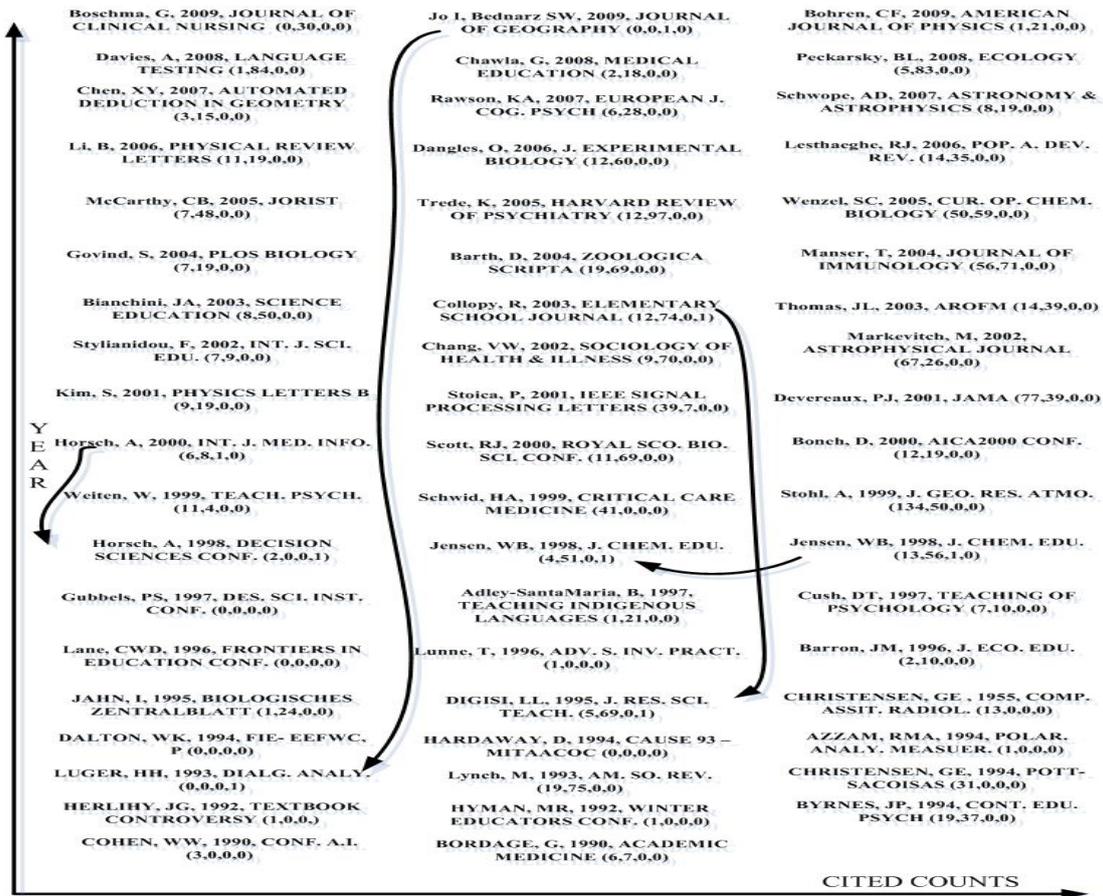


Fig.1 Top 3 Highly cited papers of year and their cited relationships

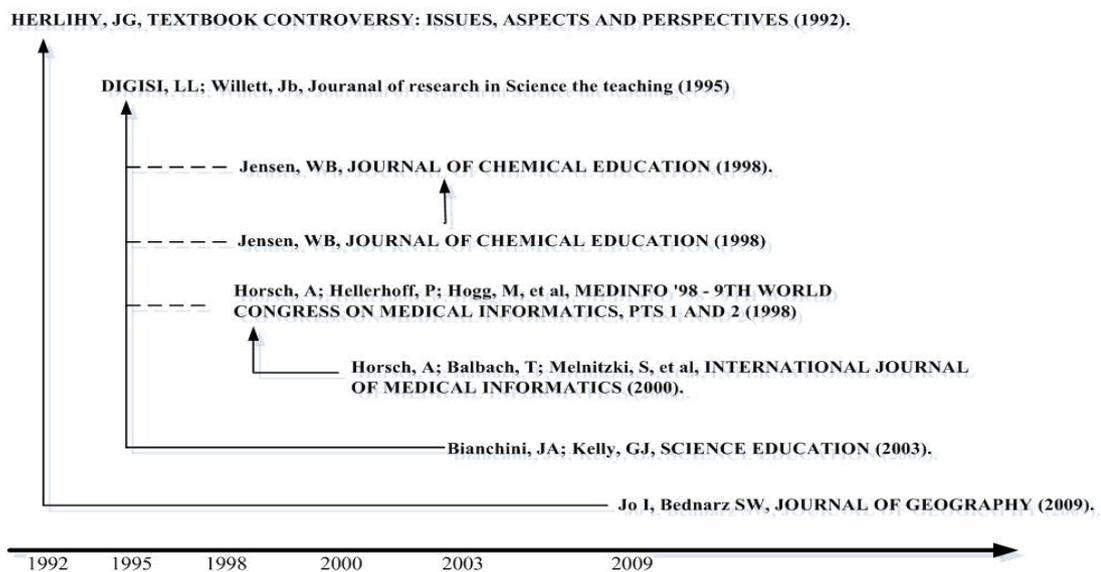


Fig.2 The cited relationship of highly cited papers of year by timeline tree

III. Method and system

The methodology and system designed in this study are described in the following section.

1. Methodology

We use 9 kinds of methods to analyze and evaluate textbook in this study. They include these methods, 1) citation from textbook, 2) citation from Web, 3) citation from academic journal, 4) library circulation rate, 5) sales rank from online store, 6) lecture textbook statistics from ministry of education, 7) Degree dissertation citation, 8) lecture textbook from professor questionnaire, 9) suggested reading textbook from professor questionnaire. These methods have no direct relation to table 2. Although method 8 and 9 use questionnaire, it is different from the table 2. The detail descriptions of methods are listed and explained as the following:

(1) Citation from textbook

Amazon.com is the largest internet bookstore in the world. It has collected over 3.1 millions kinds of digital books catalogues. It even sold books from small independent publishers and second-hand market. We use the citing counts from Amazon to evaluate the MIS textbook published by English language.

Google Books index millions of books from library and publisher. Users can search and preview books from its cooperative public library, such as Harvard, Stamford and so on. It can recommend related books and provide rating review. In the past, it also provides the citation counts for the book. Recently, this function was transferred to Google Scholar. We also use this to rank textbook in this research.

For the Chinese MIS textbook evaluation, we scan all the MIS textbooks which we can find in two university libraries. And then we count the citation times from their references.

(2) Citation from web

Google Web is the largest searching engine in the world. It indexes many kinds of contents including text, sound, picture and film on the internet. Therefore, we can get the citation counts for the books by Google Web or Google Scholar.

(3) Citation from academic journal

Many textbooks often collect or cite academic journals. And, the academic journals often cite textbooks too. Therefore, they often cite each other. In this study, we use Google Scholar and TSCI journal database (2016) to get the citation counts for the MIS textbooks.

(4) Library circulation rate

Library circulation rate could be a useful approach to evaluate textbooks. In this article, we use the library circulation from Southern Taiwan University. This university has 38 departments and graduate schools. There are 18 thousand students in this university. We use the book circulation data to calculate the citing times of Chinese and English textbooks.

(5) Sales rank from online store

We get the sales rank from two online stores. One is Amazon.com and another is Books.com.tw. Amazon is the largest online book store in the global. The sales rank for the book is available on their website. Books.com.tw is the largest online book store in the Taiwan. They don't provide sales rank for each book on their website. Therefore, we got the data from one manager. We can rank Chinese textbook through it because Amazon does not sale textbook written by Chinese language.

(6) Lecture textbook statistics from ministry of education

Some government units may collect professors' lecture textbook lists. For example, we got these from course resource network (2016). It was constructed by Ministry of Education in Taiwan. In this way, we can get the government data to proceed with textbook assessment.

(7) Degree dissertation citation

Several universities in Taiwan make up the Digital Dissertation Consortium and buy Dissertations & Theses: A&I database from ProQuest Inc. (2016). This database collects graduate student dissertation from USA and Canada. We use “information” and “management” as key words to download the dissertations from database. The degree dissertation citations were processed so that we can evaluate MIS textbooks written by English language.

National Central Library of Taiwan built one free database. It was named as National Digital Library of Theses and Dissertation in Taiwan (2016). Most of graduate students’ dissertations can be found there. It is a good and free resource to analyze citation and evaluate Chinese or English textbook.

(8) Lecture textbook from professor questionnaire

Through teacher’s filling up the questionnaire, we can collect the data for the textbooks used by university professors in their courses.

(9) Suggested reading textbook from professor questionnaire

In general, professors would suggest some additional textbooks for students to read them at home. We can also collect this kind of data to evaluate textbooks.

2. System design

The system we design was divided into three core subsystems. They are as the following: 1) Textbook Indexing & Searching Subsystem (TISS); 2) Statistics Added-Value Analysis Subsystem (SAAS); 3) Citation Report Inquiry Subsystem (CRIS). There are several modules in each subsystem. Those modules are illustrated in Fig.3. Seven external databases were used in this research. They are Library Circulation, Questionnaire, Rating, Lecture Textbook, Journal Citation, Textbook Co-Citation and Degree Dissertation Citation Databases.

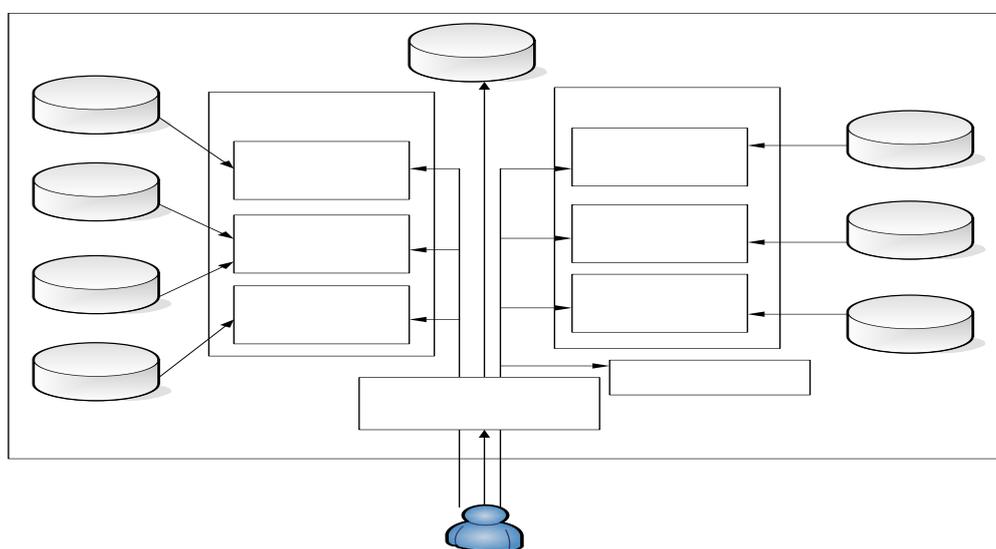


Fig.3 System architecture figure.

3. System implementation

Two kinds of languages for MIS textbook were collected in this study. Therefore, two system platforms were constructed as Fig.4 and Fig.5.

End users can not only search textbook but also rate them via this platform (Fig.6). All the textbook assessment information such as Citation from Textbook, Citation from Web, Citation from Academic Journal,

Library Circulation Rate, Sales Rank from Online Store, Lecture Textbook Statistics, Degree Dissertation Citation, Suggested Reading Textbook from Professor Questionnaire and so on can be retrieved at this platform (Fig.7).



Fig.4 Search Chinese textbook



Fig.5 Search English textbook



Fig.6 Textbook content and rating

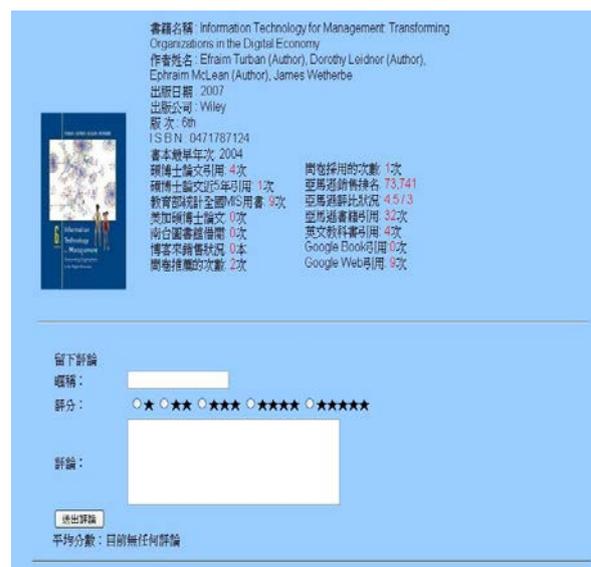


Fig.7 Textbooks evaluation results

IV. Analyzing and discussion

1. The description of dataset

Through two famous internet bookstores, Book.com.tw (2016) and Amazon.com (2016), we collected many Chinese and English textbooks in the beginning. In this study, we took MIS textbooks as the experimental example. In total, 52 Chinese and 40 English MIS textbooks are the dataset sources. See as appendix A.1 and A.2. As for these textbooks, we also collect several kinds of data sources from different sources as the following:

- (1) Citations from Amazon: Amazon is the world's largest internet bookstore, and it owns at least 3 million books. It also collects some citations data. The total cited counts from Amazon books database to our collected English MIS textbooks is 421.

- (2) Citation from Google Book: Google Book can search and browse millions of books from global library and publisher. The cited counts which Google Book cites English MIS textbooks is 425 after we collect those raw data.
- (3) Citation from Google Web: Google Web is the largest search engine in global. Many websites cite our collected MIS English textbooks. The total amounts are 268.
- (4) Citation from Dissertations & Theses Database: This database was constructed by National Central Library in Taiwan. The total cited times from all doctor and master's dissertations are 1215. Among them, the total cited times for English MIS textbook is 342, and the total cited times for Chinese MIS textbook is 873.
- (5) Borrowing Books from STUST library: In Southern Taiwan University of Science of Technology (STUST) library, the total amounts of borrowing MIS textbooks by students are 126. All of them are Chinese MIS textbook. The English textbook is 0.
- (6) Sales records from Books.com: Books.com is the largest internet bookstore in Taiwan. We got the sales raw data from their senior manager. The total sales for all Chinese MIS textbook are 1374, but the English MIS textbook is 0.
- (7) Citation from Chinese periodical: Counting cited times for textbook in all Chinese journals. After we analyze it from TSCI journal database, the total cited times are 14. Among them the cited times for English MIS textbook from Chinese periodical is 8, and the cited times for Chinese MIS textbook are 6.
- (8) Citation from English periodical: English periodical are less to cite Chinese textbook. After we analyze 15 top MIS journals, the total citing times to MIS textbook is 0.
- (9) Citation from English textbook: The total cited counts from English MIS textbook is 342. Those English MIS textbooks only cite English Textbook instead of Chinese Textbook. Therefore, the total citing times to English MIS textbook is 342, but the Chinese MIS textbook is 0.
- (10) Citation from Chinese textbook: The total cited counts from Chinese MIS textbook is 7. Those Chinese MIS textbooks only cite Chinese Textbooks instead of English Textbooks.
- (11) Statistics from Ministry of Education: In Taiwan, the Ministry of Education constructs one Course Resource Network (2012). After we retrieved and filtered their data, we found that 90 MIS textbooks were ever used or recommended by university professors. English MIS textbooks are 49 and Chinese textbook are 41.
- (12) Citation from ProQuest Dissertations & Theses Database: These keywords were used such as Information Science, Computer Science and Business Administrator in order to retrieve relevant data from ProQuest Dissertations & Theses Database. However, the total citation counts for all English MIS textbooks are only 2. We checked this twice. Therefore, we learnt that both doctor and master theses from America and Canada were less to cite MIS textbook.
- (13) Suggested Reading from Questionnaire: We asked university faculty to fill out the questionnaires in order to get the MIS suggested reading textbook. 70 MIS textbooks are recommended by faculty. The Chinese MIS textbook is 35 and the English MIS textbook is 35.
- (14) Course Textbook from Questionnaire: University Faculties were invited to fill out the survey forms in order to get their MIS course Textbooks. The total MIS textbooks are 29. English MIS Textbook is 15 and Chinese MIS Textbook is 14.
- (15) Cited Counts from Dissertations & Theses Database in Recent 5 years: The total cited counts for MIS textbooks from NCL Dissertations & Theses Database are 701 in recent 5 years. In average, the citation counts for MIS textbooks are 140 each year. The total citation for Chinese MIS textbook is 609, but the English MIS textbook is 92.

2. The relation of the booklist and edition number

In table 3, we list the different editions from the same book in the booklist. And, we compare them with different textbook assessment methods. These assessment methods and surveys include: (1) Citation from doctor's and master's theses in Taiwan. (2) The latest 5 years citations from doctor's and master's theses in Taiwan. (3) The recommendation times from university faculty by questionnaire. (4) Ministry of Education in Taiwan makes a statistics for courses textbooks used by university faculty. (5) Citing times from Chinese periodical. (6) Citing times from Google Book. (7) Amazon Sales Rank No. (8) The course textbooks used by university faculty through questionnaire. (9) Citation from doctor's and master's theses in America and Canada. (10) Citing times from Google Web. (11) The Correlation factors between different textbooks editions and different assessment surveys.

Table 3 The correlation table between book editions with assessment surveys

| ISBN | Taiwan Recent Theses | Faculty 5 Years Recommend | Gov. Statistics | Chinese Journal | Google Book | Amazon Sales | Faculty Usage | USA Theses | Google Web | |
|------------|----------------------|---------------------------|-----------------|-----------------|-------------|--------------|---------------|------------|------------|-------|
| 471787124 | 4 | 1 | 4 | 10 | 2 | 76 | 64 | 2 | 0 | 9 |
| 470169001 | 0 | 0 | 0 | 0 | 0 | 0 | 14 | 2 | 0 | 19 |
| 73230626 | 11 | 4 | 0 | 6 | 0 | 9 | 8 | 0 | 1 | 18 |
| 1418835978 | 5 | 3 | 2 | 2 | 0 | 2 | 0 | 0 | 1 | 17 |
| 132304619 | 56 | 15 | 10 | 7 | 1 | 0 | 11 | 2 | 0 | 0 |
| 1423901150 | 8 | 2 | 0 | 0 | 0 | 58 | 19 | 0 | 0 | 10 |
| CORREL | 0.78 | 0.76 | 0.66 | 0.39 | 0.31 | 0.20 | 0.02 | -0.19 | -0.07 | -0.86 |

3. Student, manufacturer and teacher's questionnaire analysis

Four top highly cited textbooks were selected from citation calculation result of doctors and master's dissertation in Taiwan. And then we design the questionnaire for students and manufacturers to score these textbooks. The AHP (Analytic Hierarchy Process) method and Expert Choice software were used to calculate the score. The weighted score means that the different decision variables were given different weights calculated from questionnaire. In the following table, two fields in the right hand side are the frequency numbers of instructors' suggested reading and their course textbook obtained from one questionnaire survey.

Table 4 Top 4 MIS textbooks' evaluation scores by questionnaires

| Author | Total Weight Score | Student Weight Score | Company Weight Score | AHP Result | Total Non Weighted Score | Student Non Weighted Score | Company Non Weighted Score | Teacher Suggest Reading | Teacher Course Textbook |
|-------------|--------------------|----------------------|----------------------|------------|--------------------------|----------------------------|----------------------------|-------------------------|-------------------------|
| Song (2001) | 27.5 | 20.6 | 6.9 | 0.1 | 275 | 208 | 67 | 4 | 2 |
| Chou (2007) | 31.6 | 23.9 | 7.7 | 0.3 | 317 | 240 | 77 | 6 | 3 |
| Lin (2008) | 30.8 | 23.9 | 6.9 | 0.3 | 312 | 243 | 69 | 5 | 3 |
| Wu(2003) | 31.5 | 24.7 | 6.8 | 0.2 | 310 | 243 | 67 | 3 | 1 |

Although the MIS textbook published by Chou Hsuan Kuang (2007) has the highest score, that book is the translation version. The original authors are Jane Laudon and Kenneth Laudon from USA. Therefore, top two traditional Chinese MIS textbooks were published by Wu Tsung Fan and Lin Dung Ching. In fig.8, the ISBN of these four books was shown in the left. According to the scores, each book was given one ranking number as X-axis. The Y-axis is different ranking method.

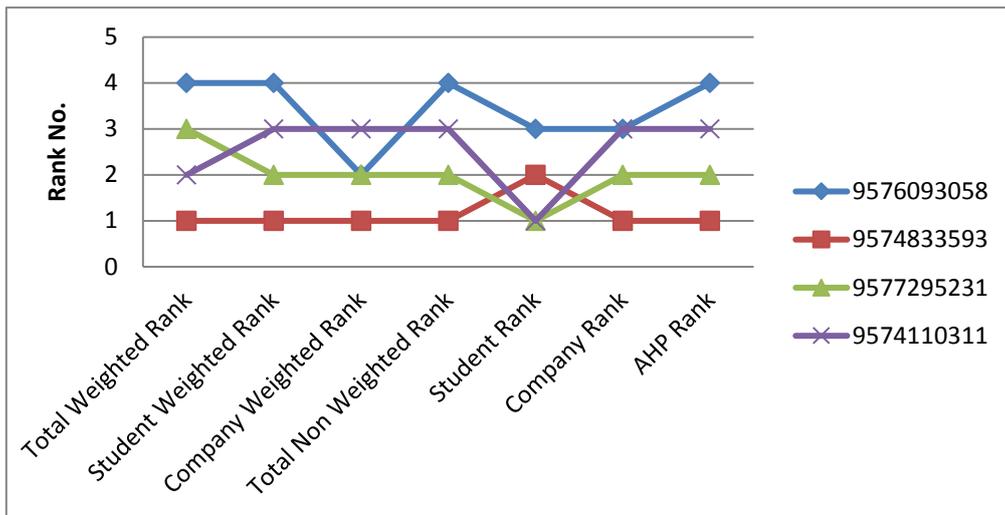


Fig.8 Top 4 MIS textbooks' ranking number by questionnaires

4. Chinese MIS textbook analysis

Nine methods were used to evaluate Chinese MIS textbook as the following table 5. They are (1) Dissertation Citation, (2) Library Circulation, (3) Web Book Store Sales Record, (4) Journal Citation, (5) Textbook Citation, (6) Ministry of Education Statistics for Textbook, (7) Professor Recommendation, (8) Lecture Textbook used by Professor, (9) Recent Five Years Citing. The top 10 textbooks and evaluated results were listed as the Table 5 and Fig.9. In Fig.9, the X-axis is the ISBN and the Y-axis is the Authoritative Coefficient of Textbook. Its formula is as the following:

Authoritative coefficient of textbook = The cited times of the textbook / The total cited times of all textbooks (1)

Table 5 Top 10 Chinese MIS textbook ranked by 9 methods

| ISBN | Dissertation Citation | Library Circulation | Store Sales | Journal Citation | Textbook Citation | Gov. Statistics | Professor Suggest | Lecture Textbook | Five YR Citing |
|------------|-----------------------|---------------------|-------------|------------------|-------------------|-----------------|-------------------|------------------|----------------|
| 9574110311 | 289 | 0.4 | 41 | 0.4 | 246 | 0.3 | 3 | 0.1 | 217 |
| 9576093058 | 85 | 0.1 | 0 | 0 | 94 | 0.1 | 0 | 0 | 68 |
| 9574833593 | 61 | 0.1 | 0 | 0 | 0 | 0 | 6 | 0.3 | 44 |
| 9574831353 | 58 | 0.1 | 0 | 0 | 0 | 0 | 1 | 0.1 | 43 |
| 9576094631 | 33 | 0.1 | 9 | 0.1 | 19 | 0 | 0 | 0 | 31 |
| 9577291864 | 56 | 0.1 | 10 | 0.1 | 31 | 0 | 2 | 0.1 | 30 |
| 9572131702 | 35 | 0.1 | 0 | 0 | 0 | 0 | 0 | 0 | 29 |
| 9577295231 | 63 | 0.1 | 32 | 0.3 | 183 | 0.2 | 5 | 0.2 | 25 |
| 9574996824 | 17 | 0 | 10 | 0.1 | 293 | 0.3 | 0 | 0 | 15 |
| 9572079530 | 11 | 0 | 5 | 0.1 | 0 | 0 | 0 | 0 | 9 |
| Sum | 708 | | 107 | | 866 | | 21 | | 511 |

5. Chinese MIS textbooks cited by degree dissertation of Taiwan

The degree dissertation database (2016) constructed by national central library in Taiwan was used to calculate the citation for Chinese MIS textbooks. The analysis results were listed as the following.

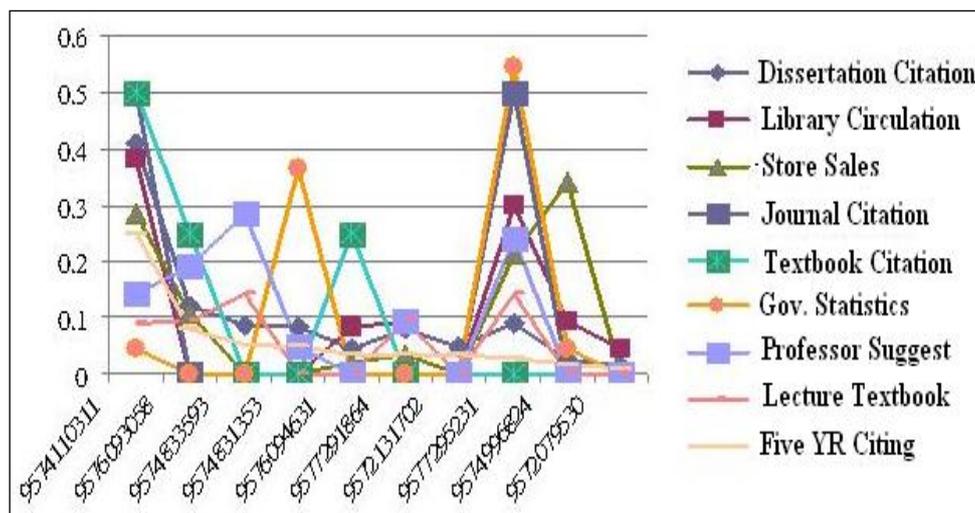


Fig.9 Frequency distribution graph for Chinese MIS textbook evaluated by 9 methods

(1) Universities analysis

Applying the citing times of the top ten of Chinese textbook draws a picture as Fig.10. In Fig.10, the Y-axis is the cited counts by dissertation. The X-axis is the top 10 universities which cite the Chinese MIS textbooks. The time period is from 1998 to 2008. The department of MIS in NTU (National Taiwan University) has 552 students and dissertations. NCCU has 411. NSYSU has 803. NCU has 761. NCKU has 332. CCU has 461. NYUST has 526. NTUST has 461. NPUST has 239. NTHU has 0. Although NSYSU has the most students in the MIS department, their citation is not the top 1. NTHU has no MIS department. However, their citations for MIS textbooks are high. It is the ranked the 10th. The special issue is that no any private university is in the top 10 list.

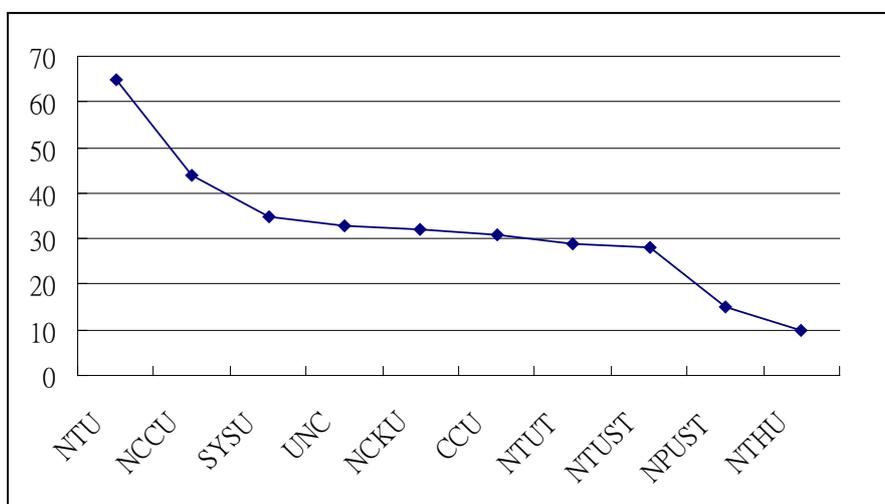


Fig.10 Top 10 cited counts by 10 universities' Dissertation

(2) Department analysis

In Fig.11, the X-axis is the top 10 department and the Y-axis is the cited counts. Department of Information Management is the 1st. It is reasonable because MIS department faculty and student often use and cite MIS textbook. Department of Business Administration is the 2nd. 8 of 10 are from business school. Both Department of National Defense Information and Department of Computer Science and Information Engineering are relevant to information. Therefore, they are also in the top 10 list although they are not in the business school.

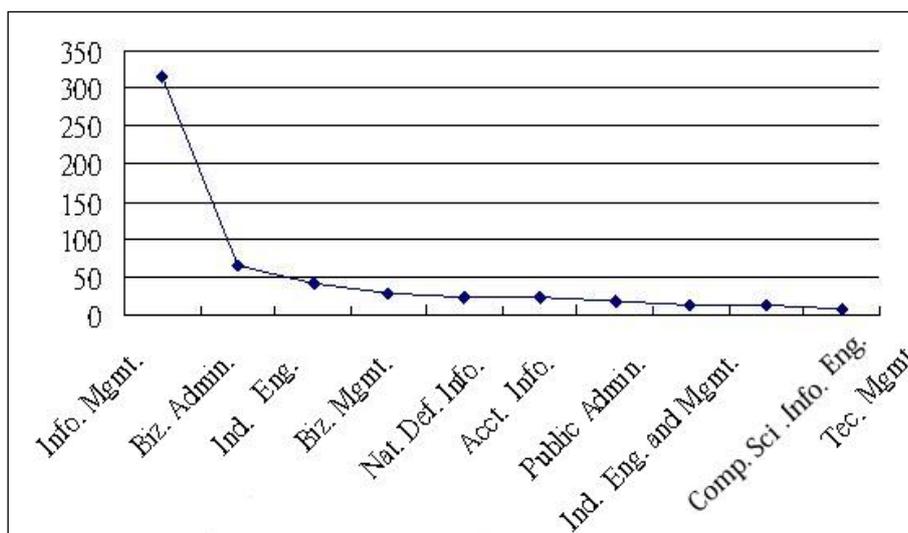


Fig. 11 Top 10 cited counts by 10 departments' dissertation.

(3) The analysis of two top Chinese MIS textbooks

In Fig.12, the X-axis is the year time span and the Y-axis is the cited counts. There are two top Chinese MIS textbooks in this figure. Top 1 textbook was written by National Taiwan University professor, Wu Tsung Fan and Hsieh Ching Chia (2003). Top 2 textbook was written by National Sun Yan-Sen University professor, Lin Dung Ching (2008). Both two books were pressed by BEST-WISE publishing CO., LTD. The citation counts from dissertation to top 1 textbook increase first and then fall down. As for the top 2 textbook, it maintains the stable in the beginning and then increase. The time span is between 1998 and 2015.

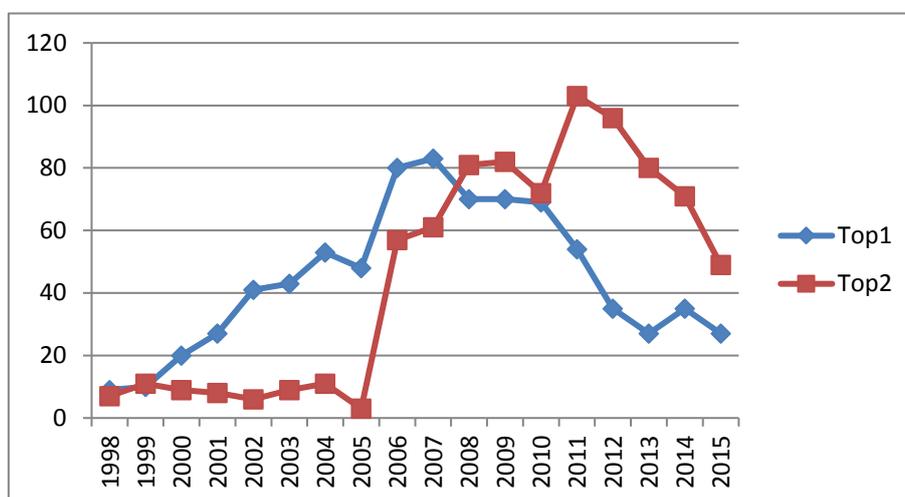


Fig.12 The cited counts for two top Chinese MIS textbooks

In Fig.13, the X-axis is the year and the Y-axis is the Textbook Impact Factor (TIF). There are two top Chinese MIS textbooks in this figure. The book titles and authors are the same with the Top 1 and Top 2 textbooks in Fig. 13. The formula of Textbook Impact Factor was shown below. The TIF for each textbook can be calculated each year. The textbooks in different domain and subject area can be compared because we let the cited counts of each book divided by all the cited counts in the same domain's textbooks.

$$\text{Textbook impact factor (TIF)} = \text{Cited counts in this year} / \text{Total cited counts for all MIS textbooks this Year} \dots(2)$$

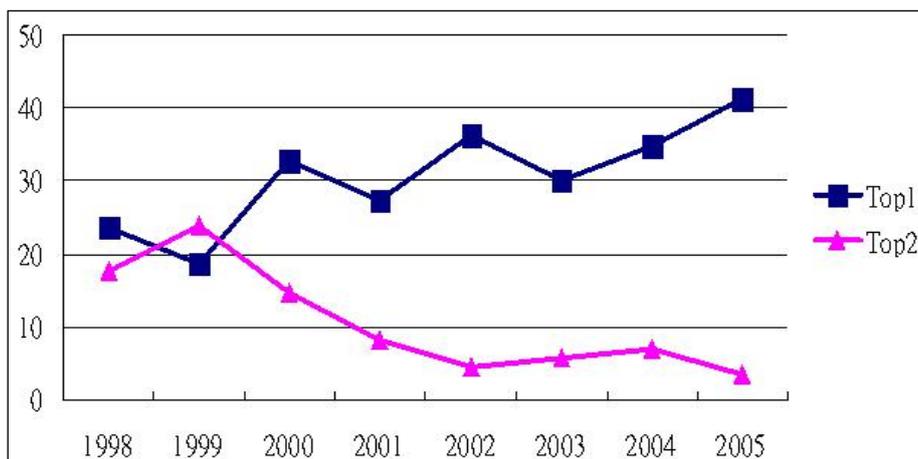


Fig.13 The textbook impact factors for two top Chinese MIS textbooks

6. English textbook analysis

All MIS English textbooks in the booklist were calculated by Google Book, Google web, doctor’s master’s theses of Taiwan, Chinese periodical , doctor’s and master’s theses of America and Canada, Amazon’s sale, questionnaires recommended and adopting etc of authoritative indicators. The raw data for calculating these authoritative indicators were from Google Book (2016), Google Web (2016), Web of Science (2016), National Library Doctor and Master’s Theses Database (2016), Technology Curriculum Resource Network of Ministry of Education (2016), the Database of Doctor’s and Master’s Theses of America and Canada (2016), Amazon Network Bookstore (2016), Collection Data of Questionnaires .

In Table 6, Fig.14 and Fig. 15, we illustrate the top 10 textbooks. In Table 6, the left field is the sales counts or citation counts. The right field is the percentage ratio. The total of percentage for each method is 1. In Fig. 14, it’s the comparison list of English textbook with heterogeneous evaluation method, it use textbook’s authoritative factor in table 6 to draw this figure. The X axle is ISBN of the English textbook, the Y axle is the percentage from counts or citation for each textbook, In Fig.15, this is the ranking comparison list of English textbook with heterogeneity evaluation method. Every English textbook are ranked by authoritative factor in table 6. The X axle is the ISBN and the Y axle is the ranking number.

Table 6 Top 10 English MIS textbook ranked by 10 heterogeneous methods

| ISBN | Amazon Sale | Google Book | Google Web | Taiwan ThesisCite | Journal Citation | Gov. Statistics | US&CA ThesisCite | Teacher Suggest | Lecture Textbook | 5YRs Citation | | | | | | | | | | |
|------------|-------------|-------------|------------|-------------------|------------------|-----------------|------------------|-----------------|------------------|---------------|----|-----|----|-----|-----|-----|-----|-----|-----|-----|
| 132304619 | 11 | 0 | 1 | 0.2 | 82 | 0.3 | 1 | 0.2 | 7 | 0.1 | 0 | 0 | 10 | 0.5 | 2 | 0.3 | 82 | 0.3 | | |
| 131854712 | 20 | 0.1 | 48 | 0.4 | 0 | 0 | 72 | 0.2 | 0 | 0 | 0 | 0 | 0 | 1 | 0.1 | 0 | 0 | 42 | 0.2 | |
| 70158282 | 22 | 0.1 | 0 | 0 | 3 | 0.8 | 72 | 0.2 | 3 | 0.8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 42 | 0.2 | |
| 007293588X | 5 | 0 | 6 | 0.1 | 0 | 0 | 44 | 0.1 | 0 | 0 | 30 | 0.6 | 0 | 0 | 6 | 0.3 | 4 | 0.6 | 39 | 0.2 |
| 73230626 | 8 | 0 | 9 | 0.1 | 0 | 0 | 17 | 0.1 | 0 | 0 | 6 | 0.1 | 1 | 0.5 | 0 | 0 | 0 | 15 | 0.1 | |
| 131889184 | 39 | 0.2 | 11 | 0.1 | 0 | 0 | 26 | 0.1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 13 | 0.1 | |
| 72947756 | 5 | 0 | 11 | 0.1 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0.1 | 0 | 0 | 9 | 0 | |
| 273643525 | 24 | 0.1 | 20 | 0.2 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | |
| 1418835978 | 0 | 0 | 2 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 2 | 0 | 1 | 0.5 | 2 | 0.1 | 0 | 3 | 0 | |
| 72947799 | 96 | 0.4 | 4 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 5 | 0.1 | 0 | 0 | 0 | 1 | 0.1 | 3 | 0 | |

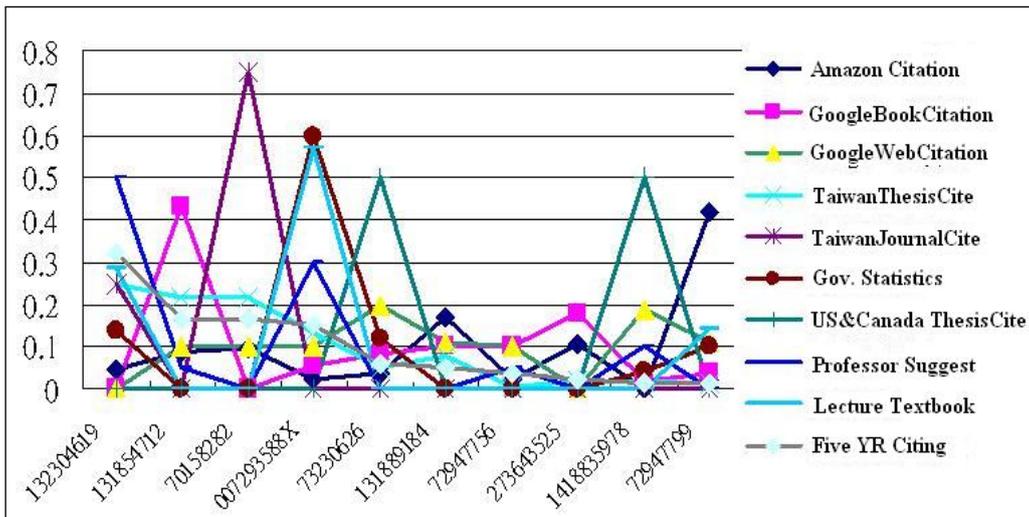


Fig.14 English textbook impact factor with heterogeneous evaluation methods

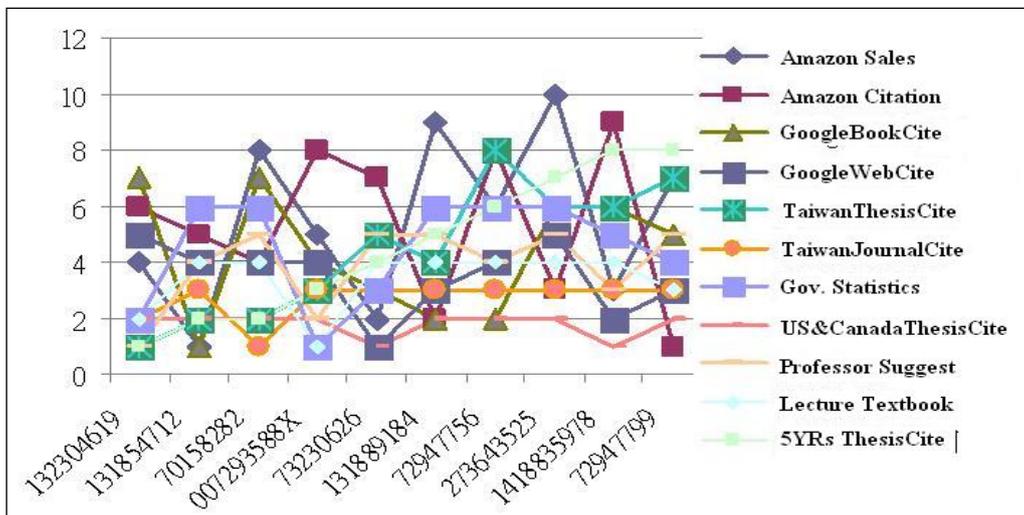


Fig.15 Ranking English textbook with heterogeneous evaluation methods.

7. The analysis of English textbooks cited by theses and dissertations in Taiwan

We proceed with English MIS textbooks citation analysis by doctor's and master's theses database of national central library (2016). The university and department analysis results are illustrated and described in the following section.

(1) University analysis

In Fig.16, the X-axis is the university and the Y-axis is the cited counts. The top 10 universities were listed to show how universities cite, read or use English MIS textbook. The cited counts were quite stable at around 10. The top 1, Chung Cheng University, is about three folds than others.

(2) Departments analysis

Using the doctor's and master's theses database of national central library (2016), we try to understand how the English MIS textbooks in the booklist are cited by different university departments. The number one is the department of information management. The second one is the department of business management. The third is the department of business management.

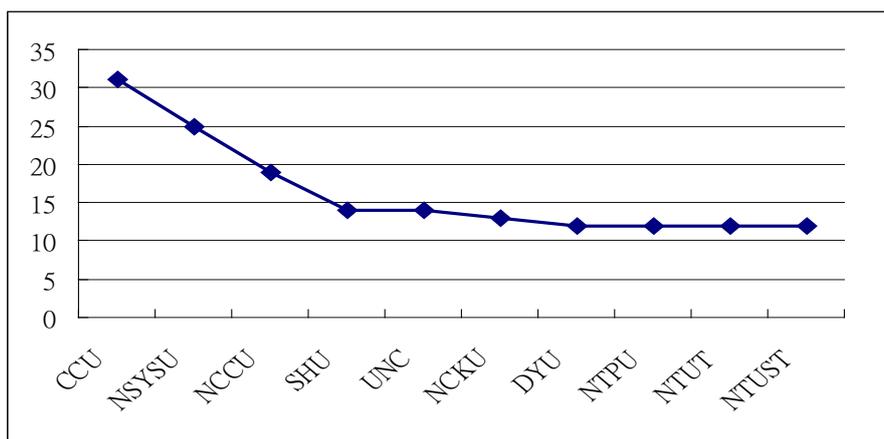


Fig. 16 Cited counts of English textbook from different university theses in Taiwan

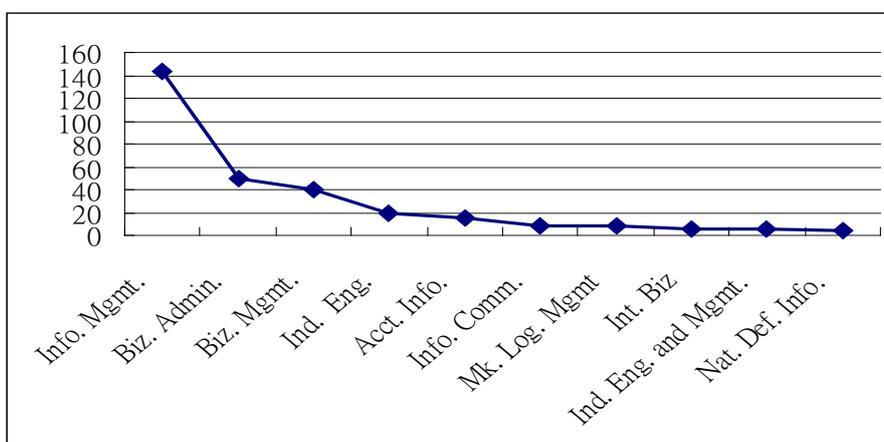


Fig.17 Cited counts of English textbook from department of university theses in Taiwan

The fourth and fifth are very close and the others are almost the same in the cited counts. In the Fig.17, the X-axle is the top ten departments and the Y-axle is the cited counts. Through this figure, we can learn the relationship between different departments.

(3) Top 2 English textbooks’ citation analysis

In the Fig.18, the X-axis is the year and the Y-axis is the cited counts. The ranking number one English textbook was written by Kenneth C. Laudon and Jane P. Laudon. The book title is Management Information Systems: Managing the Digital Firm, which was pressed by Prentice Hall. The ranking number two was written by Barbara C. McNurlin and Ralph H. Sprague. The book title is Information Systems Management in Practice, which was also pressed by Prentice Hall. Two books did not have similar pattern in citation analysis. The cited counts of 1st book increase gradually every year. But the 2nd book citation counts go up and down each year. Therefore, there was no citation pattern which we could find over here.

In Fig.19, the X-axis is the year of citation and Y-axis is the Textbook Impact Factor (TIF). This TIF was described in formula 2. In the beginning, the TIF of ranking number one was lower than ranking number two. But it increased continuously. After 2004, it leads 2nd textbook and grows up continuously. Although ranking number two textbook had high TIF in the early, it went down year by year. This book is still at the number two position because of the low TIF among all textbooks.

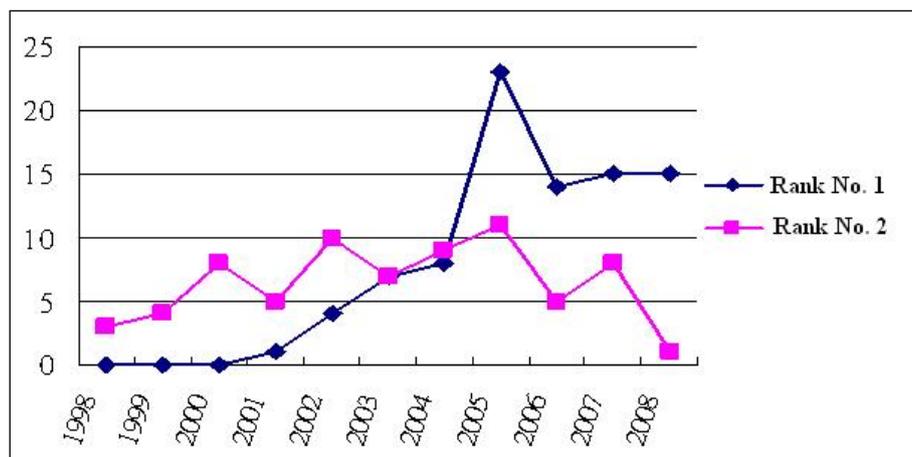


Fig.18 The top two English MIS textbook cited counts from 1998 to 2008

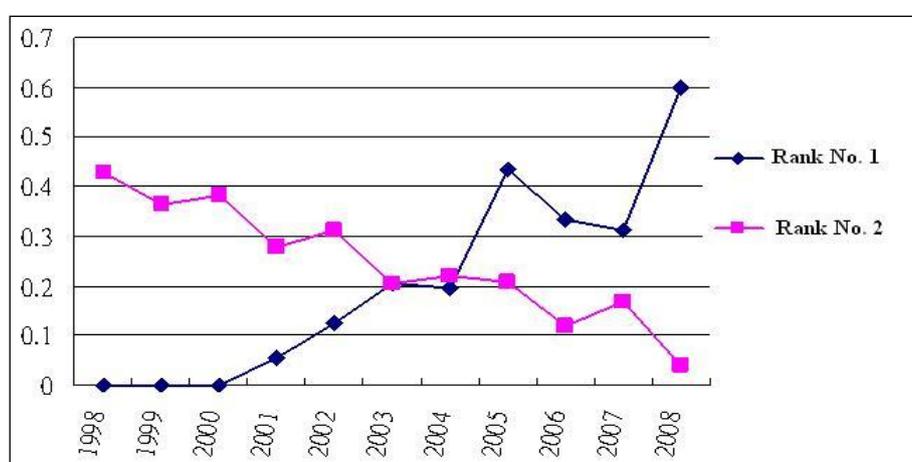


Fig.19 The top two English MIS textbook impact factors from 1998 to 2008

8. Chinese and English textbook cited by doctor's and master's thesis of Taiwan

The university, department and year analysis for Chinese and English MIS textbook citation were described as the following:

(1) University Analysis

In table 7, top 10 universities which cite English and Chinese MIS textbooks were listed. We rank them by the cited counts from dissertation database constructed by national central library in Taiwan. NTU (National Taiwan University) has the highest ranking variation. It is the best university in Taiwan. However, it cites Chinese MIS textbook more than English MIS textbook. This is not good for this university. This ranking variation is a good benchmark for different university department to understand what their master and doctoral students are reading textbooks for their research works. This is quite useful for the Non-English speaking countries to setup an alert for university.

(2) Departments Analysis

In table 8, top 10 university department which cite English and Chinese MIS textbooks were listed. We rank them by cited counts. Most of departments are from business school. This means that MIS textbook has higher impact to business school than others. Only two departments are not from business school. One is computer

science department and another is public administration department. The interesting situation is that public administration domain is not from business school. But it cited MIS domain significantly. We can use this feature to understand and explore what is going on between different domains. Even, researchers can use this kind of analysis results to think their research domain combined with other domains which no people or few people are paying attention for it.

Table 7 MIS textbooks' cited counts and ranking number from university theses citation

| Taiwan University | English MIS Textbook | | Chinese MIS Textbook | | Ranking Variation |
|----------------------|----------------------|-------------|----------------------|-------------|----------------------|
| | Cited Counts | Ranking No. | Cited Counts | Ranking No. | |
| CCU | 31 | 1 | 31 | 6 | 12.5 |
| NSYSU | 25 | 2 | 35 | 3 | 0.5 |
| NCCU | 19 | 3 | 44 | 2 | 0.5 |
| SHU | 14 | 4 | 16 | 11 | 24.5 |
| NCU | 14 | 5 | 33 | 4 | 0.5 |
| NCKU | 13 | 6 | 32 | 5 | 0.5 |
| DYU | 12 | 7 | 20 | 9 | 2 |
| NTPU | 12 | 8 | 20 | 10 | 2 |
| NTUT | 12 | 9 | 13 | 13 | 8 |
| NTUST | 12 | 10 | 28 | 8 | 2 |
| NTU | 2 | 11 | 65 | 1 | 50 |
| NYUST | 7 | 12 | 29 | 7 | 12.5 |
| NPUST | 3 | 13 | 15 | 12 | 0.5 |
| NTHU | 2 | 14 | 10 | 14 | 0 |
| Average | 12.7 | | 27.9 | | 8.3 |

Table 8 Textbooks' cited counts and ranking number from department theses citation

| Department | English Textbook | | Chinese Textbook | | |
|---------------------------------------|------------------|-------------|------------------|-------------|-------------------|
| | Cited Counts | Ranking No. | Cited Counts | Ranking No. | Ranking Variation |
| Information Management | 143 | 1 | 315 | 1 | 0 |
| Business Admin. | 49 | 2 | 65 | 2 | 0 |
| Business Affairs | 40 | 3 | 30 | 4 | 0.5 |
| Industrial Management | 20 | 4 | 43 | 3 | 0.5 |
| Accounting | 15 | 5 | 23 | 5 | 0 |
| Information and Communications | 8 | 6 | 4 | 11 | 12.5 |
| Marketing and Distribution Management | 8 | 6 | 1 | 13 | 24.5 |
| International Business | 5 | 7 | 3 | 12 | 12.5 |
| Computer Science | 5 | 8 | 12 | 9 | 0.5 |
| Defense Information | 4 | 9 | 23 | 6 | 4.5 |
| Public Administration | 2 | 10 | 17 | 7 | 4.5 |
| Industrial Engineering | 0 | 11 | 13 | 8 | 4.5 |
| Technology Management | 0 | 12 | 9 | 10 | 2 |

Table 9 The ranking and variation table for the book and its translation version

| Methods | Jane Laudon(2006) | Chou(2007) Translation | Variation |
|---|----------------------|---------------------------|-----------|
| Citation from Dissertations & Theses Database | 1 | 4 | 4.5 |
| Citation from Chinese Periodical | 2 | 3 | 0.5 |
| Statistics from Ministry of Education | 2 | 4 | 2.0 |
| Suggested Reading from Professors' Questionnaire | 1 | 1 | 0 |
| Course Textbook from Professors' Questionnaire | 2 | 1 | 0.5 |
| Cited Counts from Dissertations & Theses Database in Recent 5 years | 1 | 3 | 2 |

9. The Cross Methods Analysis for the Book with Translation Version

When we try to proceed with translation books analysis, we find that the English Textbook, ISBN: 132304619(Jane Landon, 2006) and Chinese Textbook, ISBN: 9574833593(Chou Hsuan-Kuang, 2007), were highly cited among the books with the translation version. In Table 4.7, six methods were used to rank two textbooks. All data sources of six methods were from different databases in Taiwan. That is because the scholars in Taiwan would use or cite English textbook and Chinese textbook. The scholars in English language countries would not use or cite Chinese textbook. The interesting thing is that English textbook is much more popular than its translation version in Taiwan. The reason could be that scholars and students were asked to use and read English textbook by government and top scholars. The same situation may exist in other Asia countries. The translation version for top English textbook can be sold and cited well. But the local top Textbook can defeat the translation version. According to our experiment results, this situation may exist in other domains' English textbook too.

10. The acceptable level analysis

We use the table 5 to calculate the correlation factor between nine methods. In table 10, we learn that the dissertation citation is a good method at the acceptance level. It has the highest average correlation factor compared with other methods. It also has high correlation factor with library circulation, journal citation, lecture textbook from questionnaire survey and the five years citation from dissertations. Therefore, the method, dissertation citation, is a good method which can be used to evaluate the textbooks because of its high correlation factors.

Table 10 The correlation factors between different assessment methods

| | Dissertation Citation | Library Circulation | Store Sales | Journal Citation | Textbook Citation | Gov. Statistics | Professor Suggest | Lecture Textbook | Five YR Citing | AVG |
|--------------------------|--------------------------|------------------------|----------------|---------------------|----------------------|--------------------|----------------------|---------------------|----------------------|-----|
| Dissertation Citation | 1 | 0.7 | 0.4 | 0.7 | 0.8 | 0.1 | 0.2 | 0.5 | 0.9 | 0.6 |
| Library Circulation | 0.7 | 1 | 0.7 | 0.9 | 0.5 | 0.4 | 0 | 0.4 | 0.5 | 0.6 |
| Store Sales | 0.4 | 0.7 | 1 | 0.7 | 0.4 | 0.3 | 0 | 0.2 | 0.4 | 0.5 |
| Journal Citation | 0.7 | 0.9 | 0.7 | 1 | 0.4 | 0.6 | 0.3 | 0.5 | 0.5 | 0.6 |
| Textbook Citation | 0.8 | 0.5 | 0.4 | 0.4 | 1 | -0.2 | 0 | 0.3 | 0.7 | 0.4 |
| Gov. Statistics | 0.1 | 0.4 | 0.3 | 0.6 | -0.2 | 1 | 0.3 | 0.1 | 0 | 0.3 |

(continued)

| | Dissertation Citation | Library Circulation | Store Sales | Journal Citation | Textbook Citation | Gov. Statistics | Professor Suggest | Lecture Textbook | Five YR Citing | AVG |
|----------------------|--------------------------|------------------------|----------------|---------------------|----------------------|--------------------|----------------------|---------------------|----------------------|-----|
| Professor Suggest | 0.2 | 0 | 0 | 0.3 | 0 | 0.3 | 1 | 0.8 | 0.3 | 0.3 |
| Lecture Textbook | 0.5 | 0.4 | 0.2 | 0.5 | 0.3 | 0.1 | 0.8 | 1 | 0.4 | 0.5 |
| Five YR Citing | 0.9 | 0.5 | 0.4 | 0.5 | 0.7 | 0 | 0.3 | 0.4 | 1 | 0.5 |
| AVG | 0.6 | 0.6 | 0.5 | 0.6 | 0.4 | 0.3 | 0.3 | 0.5 | 0.5 | |

11. The Suggestion

After the experiment, we found that dissertation citing textbook is the best way to calculate textbook impact factor. Dissertation reference is open data. User can export data in many different format easily. The contents are rich so that we can assessment and rank textbook. Other solutions have critical disadvantage such as poor data or non-open data. In our practical suggestion, both rich content and open data are important factors to rank textbooks.

V. Conclusion

Along with the era of knowledge-based economy is coming, textbook is an integrated publication, which collects classic theories and new important research innovations. Because textbook is a valuable media of teaching knowledge, the ways of estimating and choosing textbooks are important in today's society. Almost brick-and-mortar bookstores provide the sales charts for books of different categories for the customers as their purchase references, but the bookstores do not provide pointers for purchasing textbooks. Therefore, our method and system can provide some indicators to help customers and readers while they would like to buy and read textbooks.

This study provided new assessmentway and system platform for textbooks. The main system is divided into three parts; (1) Textbook Indexing & Searching Subsystem, TISS; (2) Statistics Added-Value Analysis Subsystem, SAAS (3) Citation Report Inquiry Subsystem, CRIS; through TISS, end users can search and browse the textbooks' introductions and citation results; SAAS provided participants questionnaires online, gathered statistics and analyzed the questionnaires; In CRIS, we built one data mart after we calculated several assessment indicators from bookstore, library, questionnaire, internet and so on. Readers can inquiry and browse indicators values through CRIS.

Through this study, we used many methods to calculate and evaluate the Textbooks. These methods include: (1) citation from textbook, (2) citation from Web, (3) citation from academic journal, (4) library circulation rate, (5) sales rank from online store, (6)lecture textbook statistics from ministry of education, (7) Degree dissertation citation,(8) lecture textbook from professor questionnaire, (9) suggested textbook from professor questionnaire. Degree dissertation citation is a good method because it has the high correlation value compared with other methods. It also has very high correlation value with library circulation, journal citation, lecture textbook from questionnaire survey and the five years citation from dissertations. Therefore, the method, dissertation citation, is a good method which can be used to evaluate the textbooks because of its high correlation factors.

After we finished the experiment, we found that the citations between textbooks are too few to calculate the impact factor for every textbook. Both citation from web and citation from academic journal have the same problem too. The sales rank from stores or online stores is the current way which most people use this now. However, Amazon is the only online bookstore unveils this data for readers. But it does not have any data for other language textbooks such Chinese or Japanese. Many physical bookstores only provide part of top selling

books instead of overall books and domains. As for library circulation rate, it is very difficult to get that data because most libraries would not provide it because they concern about reader's privacy. The limitation for Lecture textbook and suggested textbook from professor questionnaire is that most professors have low motivation to fill out the questionnaire. They also don't want to fill out the survey form from the ministry of education.

Take a comprehensive view of these methods from the above-mentioned, we find that degree thesis and dissertation is the best way because it has many advantages. First, it has enough data to calculate the textbook impact factor. Its data amounts are richer than all other methods. Second, everyone can obtain textbook citation data easily because authors were required by universities to publish their dissertations. Government or private companies like to build dissertation database because lots of readers are interested in this. Third, people can develop software system to calculate the textbook impact factor. Comparing with manual labor work, this can save more time, money and people. Finally, it is the most important that degree thesis and dissertation citation has the highest correlation values with other methods. That means that it is at the acceptance level so that we can trust this method to evaluate the textbook.

References

- 吳靜思 (2006)。高雄市國民中學社會領域教師教科書選用現況與影響因素之研究(碩士論文)。國立中山大學教育研究所，高雄市。
- 李峰松 (2004)。高級職業學校教科書選用之研究(碩士論文)。國立臺北科技大學技術及職業教育研究所，臺北市。
- 高嘉徽 (2007)。兩岸國小教科書審定與選用制度之比較研究(碩士論文)。臺北市立教育大學課程與教學研究所，臺北市。
- 張盈霏 (2003)。現行教科書選用機制之探究－以國中英語科為例。《學校行政》，26，66-83。
- 陳怡君 (2004)。應用模糊理論於教科書評選機制的建構(碩士論文)。新竹師範學院數理教育研究所，新竹市。
- 麥昌仁 (2004)。國小數學教科書評鑑研究－以九年一貫程第二學習階段為例(碩士論文)。國立中山大學教育學系研究所，高雄市。
- 黃順烈 (2004)。南投縣九年一貫課程健康與體育領域教科書使用評鑑之研究(碩士論文)。國立體育學院體育研究所，桃園。
- 黃運圭 (2005)。網路書評與購買意願的研究：臺灣網路書店的實証調查(博士論文)。國立臺灣科技大學企業管理系研究所，臺北市。
- 黃鴻書 (2004)。桃園縣國民小學英語教師專業知能及教科書評選現況之調查研究(碩士論文)。新竹師範學院國民教育研究所，新竹市。
- 劉興欽 (2006)。紮根理論應用於苗栗縣藝術與人文教科書評鑑規準之研究。《學校行政》，46，246-278。
- 劉興欽 (2005)。國民小學教科書選用評鑑規準之探討。《學校行政》，39，95-122。
- 鄭帆妤 (2007)。應用 RFID 技術於圖書館書籍評價系統之研究(碩士論文)。靜宜大學資訊管理系，臺中。
- 羅瑞珍與郭重吉(1992)。國中數學教科書內容分析與內在評鑑之研究。《科學教育》，3，199-239。
- 技專院校課程資源網 (n.d.)。Retrieved from: <http://course-tvc.yuntech.edu.tw/Web/index.aspx>.

- 博客來 (n.d.). Retrieved from: <http://www.books.com.tw>.
- Amazon (2017), (n.d.). Retrieved from <https://www.amazon.com>.
- Ike Sagie (2006). *U.S. Patent No. 10/932,486*. Washington, DC: U.S. Patent and Trademark Office.
- Sheu, J. J.(2002). A Review for The Evaluation of Science Textbooks in Western Countries. *The Journal of Education Science*, 2(1), 35-62.
- Chen, J. & Chen, J. C. (2001). QFD-based Technical Textbook Evaluation – Procedure and a Case Study. *Journal and Industrial Technology*, 18(1), 1-8.
- Kao, K. C. & Hockham, G. A. (1966). Dielectric-fiber surface waveguides for optical frequencies, *Proc.IEE*, 113(7), 1151-1158.
- Kuo, C. L. (2006), *Taiwan Patent No. 200625921*. Taipei: Intellectual Property office, Ministry of Economic Affairs, R.O.C.
- National Digital Library of Theses and Dissertation in Taiwan (n.d.). Retrieved from: <http://ndltd.ncl.edu.tw>
- Obiora, F.C. (2016), Textbook Assessment: Matching the Reader with the Reading Text. *International Journal of Arts and Humanities*, 5(1),220-226.
- ProQuest Inc. (n.d.). ProQuest dissertations and theses dissemination and ordering, Retrieved from: <http://www.proquest.com/products-services/dissertations/>
- Wright, R. A & Cohn, E. G.(1996). The Most-Cited Scholars in Criminal Justice Textbooks, 1989-1993. *Journal of Criminal Justice*, 24(5), 459-467.
- Smith, B. D. & Jacobs, D. C.(2003). TextRev: A window into how general and organic chemistry students use textbook resources. *Journal of Chemical Education*, 80(1), 99-102.
- Lindquist, T. & Wicht, H. (2007). Pleas'd By a Newe Inuention: Assessing the impact of early English books online on teaching and research at the university of Colorado at boulder.University Libraries Faculty & Staff Contributions.
- Taiwan Science Citation Index (TSCI). (n.d.). Retrieved from: <http://tsci.scholarworld.org>.
- Wang, X., Yang, Y. & Wen, X. (2009, March). *Research and Design of Computer-aided English Textbook Evaluation System*. Proceedings of 2009 First International Workshop on Education Technology and Computer Science, (pp.913-917).Wuhan, China.
- Yang, Y., Wang, X.& Wen, X. (2008, Dec.). *Evaluation of English Textbook Using Fuzzy Analytic Hierarchy Process*.Proceedings of 2008 International Workshop on Education Technology and training & 2008 international workshop on Geoscience and remote sensing (pp.30-33). Shanghai, China.

Appendix A.

Table A.1 MIS English Textbook List

| Book name | Author | Publisher | ISBN |
|--|---|-----------------------------|-------------|
| Business Driven Information Systems with MISource 2007 and Student CD | Paige Baltzan , Amy Phillips | McGraw-Hill/Irwin | 73323071 |
| Business Rules and Information Systems: Aligning IT with Business Goals | Tony Morgan | Addison-Wesley Professional | 201743914 |
| Cases on Information Technology Management in Modern Organizations | Mehdi Khosrowpour , Jay Liebowitz | IGI Global | 1878289373 |
| Corporate Information Strategy and Management: Text and Cases | Lynda M Applegate, Robert D. Austin, F. Warren McFarlan | McGraw-Hill/Irwin | 72947756 |
| Essentials of Business Information Systems | Jane P. Laudon , Kenneth C. Laudon | Prentice Hall | 132277816 |
| Fundamentals of Information Systems | Ralph Stair , George Reynolds | Course Technology | 1423901134 |
| Information Systems Management in Practice | Barbara C. McNurlin , Ralph H. Sprague | Prentice Hall | 131854712 |
| Information Systems Today: Managing in the Digital World | Leonard Jessup , Joseph Valacich | Prentice Hall | 132335069 |
| Information Systems: A Management Approach | Steven R. Gordon , Judith R. Gordon | Wiley | 047127318X |
| Information Systems: Creating Business Value | Mark W. Huber , Craig A. Piercy , Patrick G. McKeown | Wiley | 471265829 |
| Information Systems: Foundation of E-Business | Steven Alter | Prentice Hall | 130617733 |
| Information Technology for Management: Transforming Organizations in the Digital Economy | Efraim Turban , Dorothy Leidner , Ephraim McLean , James Wetherbe | Wiley | 471787124 |
| Information, Systems and Information Systems - making sense of the field | Peter Checkland , Sue Holwell | Wiley | 471958204 |
| Introduction to Information Systems | James O'Brien | Open University Press | 007110710X |
| Introduction to Information Systems: Supporting and Transforming Business | R. Kelly, Jr. Rainer , Efraim Turban | Wiley | 470169001 |
| Management Information Systems | James A. O'Brien, George Marakas | McGraw-Hill/Irwin | 007293588X |
| Management Information Systems | Gerald V Post | McGraw-Hill/Irwin | 72947799 |

(continued)

| Book name | Author | Publisher | ISBN |
|---|---|-------------------------------|------------|
| Management Information Systems | Jane Laudon, Kenneth Laudon | Prentice Hall | 131014986 |
| Management Information Systems | Raymond McLeod , George Schell | Prentice Hall | 131889184 |
| Management Information Systems | Effy Oz | Course Technology | 1418835978 |
| Management Information Systems & Multimedia Student CD Package | Jane P. Laudon , Kenneth C. Laudon | Prentice Hall | 132337746 |
| Management Information Systems for the Information Age | Stephen Haag , Maeve Cummings , Donald J. McCubbrey | McGraw-Hill/Irwin | 73023884 |
| Management Information Systems for the Information Age with CD and MISource | Stephen Haag , Maeve Cummings , Amy Phillips | McGraw-Hill/Irwin | 73230626 |
| Management Information Systems with MISource 2007 | James A. O'Brien , George Marakas | McGraw Hill Higher Education | 71286268 |
| Management Information Systems with student CD and MISource 2007 | Stephen Haag , Maeve Cummings | McGraw-Hill/Irwin | 77240596 |
| Management Information Systems: Conceptual Foundations, Structure, and Development | Gordon Bitter Davis | Mcgraw-Hill College | 70158282 |
| Management Information Systems: Managing the Digital Firm | Jane Laudon, Kenneth Laudon | Prentice Hall | 132304619 |
| Management of Information Technology, Fourth Edition | Carroll W Frenzel , John Frenzel | Course Technology | 619034173 |
| Managing and Using Information Systems | Keri E. Pearlson , Carol S. Saunders " | Wiley | 471715387 |
| Managing Information Systems: Using Cases within an Industry Context to Solve Business Problems with Information Technology | David L. Anderson | Prentice Hall | 201611767 |
| Mastering Information Management | Donald Marchand , Thomas H Davenport , Tom Davenport , Don Marchand | Financial Times Prentice Hall | 273643525 |
| MIS Cases: Decision Making with Application Software | Lisa Miller | Prentice Hall | 132214385 |
| Principles of Information Systems | Ralph Stair , George Reynolds | Course Technology | 1423901150 |

Table A.2 MIS Chinese Textbook List

| Book name | Author | Publisher | ISBN |
|------------------------|--|-----------|------------|
| MIS 管理資訊統 | 林傑斌、劉明德 | 文魁資訊 | 9861252169 |
| 全球 EMBA 名師開講：資訊管理篇 | 許士軍、盧希鵬、簡國樑、張明諭、劉世平、郭庭魁 | 培生 | 9861545220 |
| 當代管理資訊系統 (第二版) | 朱海成 | CS | 9867777174 |
| 資訊管理 | 榮泰生 | 松崗 | 9572204998 |
| 資訊管理 | 陳文賢 | 東華 | 9574831353 |
| 資訊管理 | 許晉龍 | 儒林 | 9574996824 |
| 資訊管理 | 廖述賢 | 雙葉 | 9867433750 |
| 資訊管理 | 孫惠民 | 松崗文魁 | 9861257624 |
| 資訊管理 | 唐納德·馬爾錢德、湯瑪斯·戴文波特 | 培生普林斯頓 | 9867491815 |
| 資訊管理：理論與實務(第五版) | 吳琮璠(Wu Tsung Fan), 謝清佳(Shie Ching Jia) | 智勝 | 9574110311 |
| 資訊管理：聯繫於策略優勢 | 審訂:季延平 | 智勝 | 9577291864 |
| 資訊管理：邁向廿一世紀的新管理觀念 | 吳武明 | 松崗 | 9572228722 |
| 資訊管理：e化企業的核心競爭能力 | 林東清(Lin Dung Ching) | 智勝 | 9577295231 |
| 資訊管理內部控制與稽核 | 蔡篤村 | 富春文化 | 9579318328 |
| 資訊管理系統 | 黃聖峰、陳人豪 | 文魁資訊 | 957466967x |
| 資訊管理：思維與策略 | 朱海成 | 碁峰 | 9864218883 |
| 資訊管理突破暨總整理 | 廖平、白馨棠 | 儒林 | 9576528259 |
| 資訊管理理論與實務：企業 e 化的藍圖與建置 | 林震岩 | 學貫 | 9867693930 |
| 資訊管理概論 | 林傑斌、劉明德 | 文魁資訊 | 9861252495 |
| 資訊管理概論：企業 e 化建置實務 | 林震岩 | 學貫 | 9867198662 |
| 資訊管理與系統 | 蔡邦仁 | 華泰 | 9572079530 |
| 資訊管理學(第五版) | 榮泰生 | 華泰 | 9576094631 |
| 資訊管理導論 | 范錚強、范懿文、侯永昌、林世材 | 旗標 | 9574422917 |
| 資訊管理導論 | 廖平、廖鴻圖 | 儒林 | 9574996433 |
| 網路與資訊管理突破暨總整理 | 廖平 | 儒林 | 957499712x |
| 資訊管理導論 | 葉宏謨等 | 國立空中大學 | 9576612233 |
| 資訊管理導論 | 陳玄玲、王明輝 | GL | 9861540849 |
| 管理資訊系統 | 楊正甫、應敏貞 | 全華 | 9572131702 |
| 管理資訊系統 | 施弼耀、陳國雄、陳昭蓉、楊恭娟、劉仁俊、邱郁文 | CS | 9572924672 |

(下頁續)

| Book name | Author | Publisher | ISBN |
|----------------|--------------------------------------|-----------|------------|
| 管理資訊系統 | 季延平 | 旗標 | 9574421384 |
| 管理資訊系統 | 林信志、林秋娟、廖文華 | GL | 9574939561 |
| 管理資訊系統 | 林鳳寧 | 博碩 | 9575279158 |
| 管理資訊系統 | 張海青、呂執中、丁志宏 | 華泰 | 9576090849 |
| 管理資訊系統 | 宋鎧、范錚強、郭鴻志、陳明德、季延平 | 華泰 | 9576093058 |
| 管理資訊系統 | 榮泰生 | 華泰 | 957609433X |
| 管理資訊系統 | 盧希鵬、葉乃菁、鄒仁淳 | 華泰 | 9576095948 |
| 管理資訊系統 | 丁宇、曹中天 | 鼎茂 | 9578201893 |
| 管理資訊系統 | 董和昇 | CS | 9861570489 |
| 管理資訊系統 | Raymond McLeod, Jr.、George P. Schell | 碁峰 | 9867491823 |
| 管理資訊系統(第六版) | 曹中天 | 鼎茂 | 9861222170 |
| 管理資訊系統：管理數位化公司 | 周宣光(Chou HsuanKuang) | 東華 | 9574833593 |
| 管理資訊系統突破暨總整理 | 廖平、邱惠琪 | 儒林 | 9574996689 |
| 管理資訊系統理論與實務 | 邱文山 | 金禾資訊 | 9867844777 |
| 管理資訊系統概論 | James A. O'Brien | 學貫 | 9574936740 |
| 管理資訊系統概論 | 王信博 | 金禾 | 9578573863 |
| 管理資訊系統概論 | 董和昇 | GL | 9861572368 |
| 管理資訊系統：管理數位化公司 | Laudon, Kenneth C.Laudon, Jane P. | CS | 9574831477 |
| 管理資訊系統精要 | 樂斌 | GL | 9574939545 |
| 輕輕鬆鬆突破資訊管理 | 吳燦銘 | 松崗 | 9572221035 |
| 優質資訊管理 | 河村韓夫 | 世茂 | 9575296184 |

Table A.3 Decision Factors Weights by AHP Analysis Method.

| No | Decision Factor | AHP Score |
|----|---|-----------|
| 1 | Both logic and definition are well. | 0.103 |
| 2 | The back content can match the front content. | 0.000 |
| 3 | The sequence arrangement is good. | 0.113 |
| 4 | Explain the content well. | 0.099 |
| 5 | Easy to understand. | 0.190 |
| 6 | Inspire students to find more questions and extend more thoughts. | 0.128 |
| 7 | Do not increase student desire to learn it. | 0.120 |
| 8 | Update contents continuously. | 0.075 |
| 9 | Appendix resources are very rich. | 0.061 |
| 10 | It is fit to student ability. | 0.112 |