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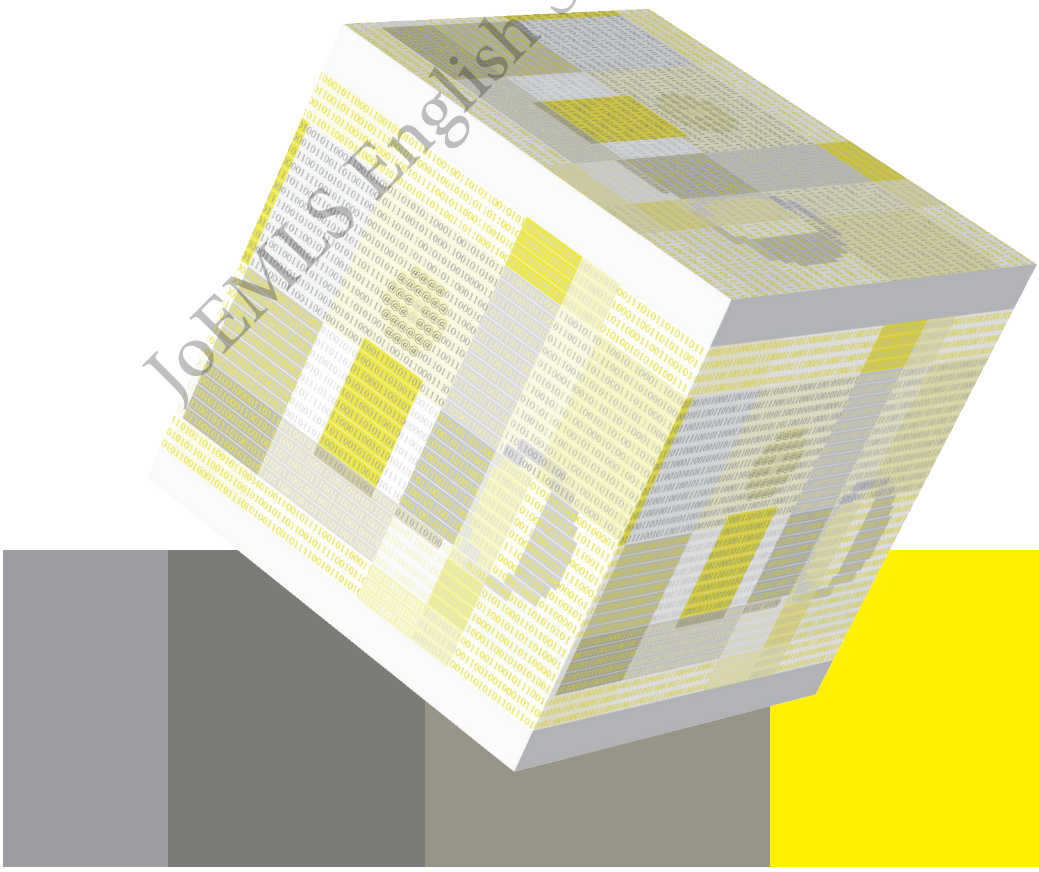

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教育資料與圖書館學 JOURNAL OF EDUCATIONAL MEDIA & LIBRARY SCIENCES Vol. 52, No. 3, Summer 2015

教育資料與圖書館學，始於1970年3月創刊之**教育資料科學月刊**，其間於1980年9月更名為**教育資料科學**，改以季刊發行。自1982年9月起易今名，而仍為季刊，每年冬(1月)、春(4月)、夏(7月)與秋季(10月)各出刊一期，合為一卷。現由淡江大學出版中心出版，淡江大學資訊與圖書館學系和覺生紀念圖書館合作策劃編輯。本刊為國際學術期刊，2008年獲國科會學術期刊評比為第一級，2015年獲科技部人文社會科學研究中心評定為教育學門專業類A級期刊。並廣為海內外知名資料庫所收錄(如下英文所列)。

The JOURNAL OF EDUCATIONAL MEDIA & LIBRARY SCIENCES *(JoEMLS)*, published by the Tamkang University Press and co-published with the Department of Information & Library Science (DILS) and Chueh Sheng Memorial Library, was formerly the ***Bulletin of Educational Media Science*** (March 1970 – June 1980) and the ***Journal of Educational Media Science*** (September 1980 – June 1982). The *JoEMLS* has been a quarterly as well as a new title since September 1982, appearing in Winter, Spring, Summer and Fall issues.

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教育資料與圖書館學 封面意義：躍升於紙本印象上的數位與網路化圖書資訊圖騰。
The cover design of ***JoEMLS*** signifies:
L (Librarianship); **I** (Information Technology); **B** (Bibliophile and the Book trade)

教育資料與圖書館學
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JoEMLS 編輯政策

本刊係採開放存取（Open Access）與商業資料庫付費途徑，雙軌發行之國際學術期刊，兼具電子版與紙本之平行出版模式。本刊除秉持學術規範與同儕評閱精神外，亦積極邁向InfoLibrary寓意之學域整合與資訊數位化理念，以反映當代圖書資訊學研究趨勢、圖書館典藏內容與應用服務為本；且以探討國內外相關學術領域之理論與實務發展，包括圖書館學、資訊科學與科技、書業與出版研究等，並旁及符合圖書資訊應用發展之教學科技與資訊傳播論述。

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*JoEMLS*向來以「綠色期刊出版者」（Green Publisher / Journal）自居，同意且鼓勵作者將自己投稿至*JoEMLS*之稿件，不論同儕評閱修訂稿與否，都能自行善加利用處理，但希望有若干限制：

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JoEMLS Editorial Policy

The *JoEMLS* is an Open Access (OA) Dual, double-blind reviewed and international scholarly journal dedicated to making accessible the results of research across a wide range of Information & Library-related disciplines. The *JoEMLS* invites manuscripts for a professional information & library audience that report empirical, historical, and philosophical research with implications for librarianship or that explore theoretical and practical aspects of the field. Peer-reviewed articles are devoted to studies regarding the field of library science, information science and IT, the book trade and publishing. Subjects on instructional technology and information communication, pertaining to librarianship are also appreciated. The *JoEMLS* encourages interdisciplinary authorship because, although library science is a distinct discipline, it is in the mainstream of information science leading to the future of **InfoLibrary**.

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(1) authors can archive both preprint and postprint version, the latter must be on a non-commercial base;
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(3) published source must be acknowledged with citation.

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EDITORIAL

In and Beyond This Issue

During the process of writing academic papers, if one procedure could be described as "minute, complicated, but important", that would be formatting citations. Academic writing and citing have become the basic foundation of a scholar's information literacy, but in addition to this, there is a specific method of citation solely existing in journal publishing, neither familiar by authors and readers, nor by journal editors. It is "guidelines of Romanized citations". Although Romanized citations have a different purpose from general citations, it is necessary to give more serious thought to Romanized citations, for Chinese-language academic journals to be seen on the international platform.

Journal of Educational Media and Library Sciences (*JoEMLS*) has already used Romanized citation guidelines to edit published manuscripts since Issue 1, Volume 46 (Fall Issue of 2008), and developed and announced relevant formation guidelines. Before that, only a small number of A&HCI journals ever used Romanized citations, but without formal guidelines. The development and announcement of Romanized citation guidelines by *JoEMLS* could be considered as a pioneering work in Taiwan, as well as in the international platform. In these years, our journal has been engaging in on-going modification and reform on relevant practices, and finally in July 2014, the book *APA, Chicago (Turabian) and Romanization of Referencing Styles for Chinese Academic Writing*, was formally published by Tamkang University Press, providing a comprehensive reference for authors and editors of academic journals.

We believe that for its meaning and value to be realized by the world, the Romanized Citation guidelines should be implemented and promoted. For celebrating the first anniversary of the book's publication, with the consent of Tamkang University Press, we plan to share and publish partial content of the book in this (Issue 3, Volume 52) and next issue. For details of Romanized editing and guideline explanations, we hope readers could refer to the full content in the actual book. We sincerely hope to gain support and feedbacks from more scholars and journal editors.

For the requirements of our journal's editing and reviewing, eight manuscripts were reviewed during the publishing process. Five manuscripts were rejected, with a rejection rate of 62.5%. Three manuscripts were accepted, including "Organizational Innovation Behavior in Taiwan's University Libraries: A Quantitative Study" by Chen Su-May Sheih, "A Study of the Subject

Categorization of the MIS-related Journals in the ISI Databases Using Topical Features in the Text Content and Machine Learning Methods" by Sung-Chien Lin, and "The Effects of Teacher and Teacher-librarian High-end Collaboration on Inquiry-based Project Reports and Monthly School Test Scores of Fifth-grade Students" by Hai-Hon Chen. By the publication date of this issue, another eight manuscripts are still at the review stage.

We gladly to share another great news—our journal *JoEMLS* has been collected into the internationally known database *Cabell's Directory of Publishing Opportunities*. The Cabell's database was launched in 1978, with a strict policy on journal collection. It provides detailed information on collected journals' publication management systems, editorial lag, statement of impact, etc., for assisting international scholars to find quality journals for manuscript submission. We will strive to make our journals collected by more international journal databases, thus facilitating the academic communication of our authors' research findings and enhancing their academic influences.

Jeong-Yeou Chiu
JoEMLS Chief Editor

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Organizational Innovation Behavior in Taiwan's University Libraries: A Quantitative Study

Chen Su-May Sheih

Research Article

Abstract

In this era of innovative economics, libraries need to actively engage in organizational innovation behaviors for keeping up with the ever-changing environment, and provide patrons with information services of quality and efficiency for ensuring an ever-lasting existence in a fast-moving society (Kurt, Kurt, & Medaille, 2010; Olaisen, Lovhoiden, & Djupvik, 1995). However, examining literature on library and information studies in Taiwan, it is not easy to find empirical studies on organizational innovation behaviors in university libraries. Therefore in this study, librarians in Taiwan's university libraries were surveyed for investigating organizational innovation behaviors in Taiwan's university libraries and affecting factors. The research questions of this study include: How librarians identify with the concept of organizational innovation in university libraries? What are the organizational innovation behaviors in university libraries? How librarians identify with the new climate of organizational innovation behaviors in university libraries? What are the features of organizational structures of university libraries? What are the factors affecting organizational innovation behaviors in university libraries? The findings of this study could be a reference for practices of university libraries.

Keywords: *Organizational innovation behavior, Organizational innovation, Innovation, University library*

SUMMARY

In this era of innovative economics, libraries need to actively engage in organizational innovation behaviors for keeping up with the ever-changing environment, and provide patrons with information services of quality and efficiency for ensuring an ever-lasting existence in a fast-moving society (Kurt, Kurt, & Medaille, 2010; Olaisen, Lovhoiden, & Djupvik, 1995). As for university libraries, the users are inclined to accessing resources through search engines or other channels provided by profit corporations because the services are beyond spatial or temporal limits. In the consequence, university libraries might utilize organizational innovation behaviors to rearrange or improve the internal management as well as provide innovative services.

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Organizational innovation behaviors include conception, approach, procedure, production, policy, facility, organizational structure, or service never adopted by the organization yet. Based on relevant literature, organizational innovation behavior of libraries can be categorized into two groups, including "management innovation" and "technical innovation" (Chang, 2006; Damanpour & Evan, 1992; Drucker, 1976; He & Wang, 2008; Reynolds & Whitlatch, 1985). Meanwhile, the factors affecting organizational innovation behavior of libraries are librarians' personal traits, management, internal factors, and the external environmental factors of the organization.

Recently, several university libraries have ushered in the conception of organizational innovation behavior from business management. However, examining literature on library and information studies in Taiwan, it is not easy to find empirical studies on organizational innovation behaviors in university libraries. Therefore in this study, librarians in Taiwan's university libraries were surveyed for investigating organizational innovation behaviors in Taiwan's university libraries and affecting factors.

The research questions of this study include: How librarians identify with the concept of organizational innovation in university libraries? What are the organizational innovation behaviors in university libraries? How librarians identify with the new climate of organizational innovation behaviors in university libraries? What are the features of organizational structures of university libraries? What are the factors affecting organizational innovation behaviors in university libraries? The findings of this study could be a reference for practices of university libraries.

Research Design and Implementation

In this study, a general survey of Taiwan's university libraries was adopted. With the research goal of this study in mind, and based on relevant literature (Amabile, 1995; Damanpour, 1991; Djellal & Gallouj, 2001; Robbins, 1983; Tsai, 1997) and realities in university libraries, the researcher developed the survey for this study, containing four parts as " respondents' personal data", "library organizational innovation behavior scale", "library organizational innovation climate scale", and "library organizational structure scale". According to relevant literatures, the researcher categorized organizational innovation behaviors into two groups, including "management innovation" and "technical innovation".

The researcher contacted personnel in charge in university libraries around Taiwan asking for participation in filling out surveys, and gained positive responses from 144 university libraries. Paper surveys were then sent out to those libraries. In average, four or five surveys were delivered to each university library.

In June 2010, 111 pre-test surveys were sent out and collected. After analyzing and revising the formal questionnaire, 800 formal surveys questionnaires were sent out in October, 2010. By November 2010, 796 questionnaires were collected, with a response rate of 99.5%. After deleting 11 incomplete questionnaires, 785 were considered as valid questionnaires, with an effective response rate of 98.6%.

Research Findings

1. Librarians' Conception of Organizational Innovation Behaviors in University Libraries

In this study, the overall score of "library organizational innovation behaviors scale" is 3.52 (standard deviation = 0.54). As to the individual constructs, the average score of "Management Innovation score" is 3.45 (standard deviation = 0.57), slightly lower than the Technical Innovation score of 3.67 (standard deviation = 0.55). This finding revealed that librarians considered the technical innovations of university libraries slightly better or more than the management innovation.

2. Librarians' Conception of Organizational Innovation Climate in University Libraries

The average score of "Librarians' Conception of Organizational Innovation Climate in University Libraries" is 3.71 (standard deviation = 0.55), close to the identification degree of "agree". Most librarians agreed that a health organizational climate might benefit the utilization of innovational behaviors.

As to the constructs in Organizational Innovation Climate score, the average score of "Team Support" is the highest, following by the constructs of "Organizational Encouragement" and "Work Independence and Challenge", respectively. The constructs of "Supervisor Support" and "Resources and Learning" had relatively lower scores.

3. Librarians' Conception of Features of University Libraries' Organizational Structures

Scales of formalization and centralization are used to evaluate the features of university libraries' organizational structures. From the results of questionnaires, we can see that the average score of organizational formalization is 3.80 (standard deviation = 0.51), close to the identification degree of "agree". The average score of organizational centralization is 2.22, indicating that librarians consider a relatively higher degree of organizational centralization.

4. Factors of Affecting Organizational Innovation Behaviors in University Libraries

Multiple Aggression Analysis was used in this study. The results showed that the three constructs of organizational innovation climate—supervisor support,

organizational encouragement, resources and learning—had a significantly positive influence on innovation behaviors in university libraries. In addition, the degree of organizational formalization had a significantly positive influence on innovation behaviors in university libraries; the construct of individual decision making had a significantly negative influence on innovation behaviors in university libraries.

Conclusions

1. Librarians acknowledged organizational innovation behaviors in university libraries

Results of this study showed that the score of librarians' conception toward organizational innovation behaviors in university libraries is 3.52, indicating that librarians had a positive opinion on this matter.

2. Technical innovation had a more significant performance than management innovation in university libraries

It showed in this study that librarians considered there was a higher degree of technical innovation than organizational innovation in university libraries. Among these, the fact that libraries timely adjust services or provide new services according to patrons' needs and opinions gained the most acknowledgements.

3. Librarians considered a healthy organizational climate would promote innovative behaviors in university libraries

The score of librarians' conception of organizational innovation climate is 3.71, indicating that librarians' had a positive opinion on the fact that a healthy organizational climate promotes innovation behaviors in university libraries.

4. The level of organizational formalization in university libraries was above the average

For the aspect of organizational structures, the score of formalization scale is 3.80, and the score of centralization is 2.22, indicating that university libraries had a feature of higher degree of organizational formalization and centralization.

5. Individual decision making had a significantly negative influence on organizational innovation behaviors in university libraries

The results of Multiple Aggression Analysis showed that, in the construct of degree of organizational centralization, supervisors' decision making had no significant influence on organizational innovation behaviors. However, the construct of individual decision making had a negative influence on organizational innovation.

6. Constructs of organizational formalization, supervisor support, organizational encouragement, and resources and learning, had significantly positive influences on organizational innovation behaviors

The degree of organizational formalization had a significantly positive influence on organizational innovation behaviors in university libraries. As to the organizational innovation climate, the constructs of supervisor support, organizational encouragement, and resources and learning, had a significantly positive influence on organizational innovation behaviors in university libraries.

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Research Article

A Study of the Subject Categorization of the MIS-related Journals in the ISI Databases Using Topical Features in the Text Content and Machine Learning Methods

Sung-Chien Lin

Abstract

In this study we analyzed and discussed that the MIS-related journals under the ISI subject category of IS&LS are simultaneously given with subject category Management, using methods of topic modeling, journal clustering and subject category prediction. In the experiment of journal clustering, all journals under subject category Management and other journals also having similar topical features can be gathered into a cluster, and "management" is their common and the most distinct topic. Because the journals belonged to this cluster are almost same to those in the MIS clusters generated by the previous studies, we considered it as the MIS cluster in this study. In the second experiment, we used the classification and regression tree (CART) technique to predict assignment of subject category with that the journals in the original subject category Management and in the MIS cluster produced in this study as positive examples, respectively. The trees generated by the two tests both used the occurring probabilities of the topic "management" as the main classification rule. However, in the latter test, we did not only obtain a simpler classification tree but also had a result with less predicting errors. This means that if all journals in the MIS cluster could be given with subject category Management, the retrieval results can be more effective and complete.

Keywords: *ISI subject category, Machine learning, Topic modeling, Journal clustering, Category prediction*

SUMMARY

Introduction

In the previous studies about cluster analysis of journals related to the field of Library and Information Science (LIS), such as the studies by Ni, Sugimoto, and Cronin (2013) and Tseng and Tsay (2013), the researchers usually used the journals under the subject category Information Science and Library Science (IS&LS) in the Institute for Scientific Information (ISI) databases as data for analysis. Most of them found that there were a few journals grouped into a unique

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cluster apart from other journals and the most common theme of these journals was Management Information Systems (MIS). Several of the MIS-related journals were simultaneously given with another subject category Management in the ISI databases but a few of them were not. Thus when users request data of MIS journals from the ISI databases, they can't retrieve the whole set of data by using only the subject category Management as queries. Does it mean that the assignment of subject category Management to these MIS-related journals in the ISI databases were not comprehensive?

From the point of information retrieval, two experiments took place in this study to analyze and discuss the assignment of subject category Management to the MIS-related journals under the subject categories of IS&LS. The present study used two different machine learning techniques and it was based on topical features extracted from the text content in journals. The first experiment was the cluster analysis of IS&LS journals according to the topical features contained in the journals to explore the cluster structure of the examined journal set and important topical features emerging in each of the clusters. Cluster analysis is known as a kind of unsupervised learning methods and it had been widely used in the studies of LIS. In the second experiment, we used classification and regression tree (CART) (Breiman, Friedman, Stone, & Olshen, 1984), a technique for supervised learning, to predict the assignment of subject category Management to IS&LS journals. We then examined the MIS-related journals that are not currently categorized as Management journals and discussed if these journals should be in the Management category in order to improve retrieval effectiveness.

Methods

The research data of this study were bibliographic data of papers published in IS&LS journals retrieved from the Web of Science database with the search criteria that a) any journal title that is in the list of subject category IS&LS in 2013 JCR (Social Science Edition) and b) the publication year is between 2007 and 2013. Text data in the Title and the Abstract fields of the articles in the same year and in the same journal were combined into a document. The IS&LS journals without the Title and Abstract data in the database were dropped in this study. The documents between 2007 and 2012 were used as training data to estimate parameters of topic models, to generate the topical features for each journal, to perform cluster analysis, and to create classification trees for predicting the assignment of subject category Management to the journals. The remainders of the documents were then used as test data in the experiment of subject category prediction.

After preparing text data for training and testing, documents in the training data were firstly input to the method of topic modeling (Blei, Ng, & Jordan, 2003; Griffiths & Steyvers, 2004) to compute the topical features for each journal in the dataset. To each document a feature vector was assigned, which was composed of the estimated probabilities of every topics occurring in the corresponding document. Each topic in the study was also represented by a feature vector consisting of occurring probabilities of all word tokens when the topic appeared in documents.

In the experiment of journal clustering, a feature vector for each journal was computed by averaging the feature vectors of documents corresponded to the journals in the training data. Dissimilarity between any pairs of two journals was estimated by the symmetric Kullback-Leibler divergence (Rzeszutek, Androutsos, & Kyan, 2010) of the corresponded feature vectors. Clustering algorithm used in this study grouped journals with similar topical features based on the estimated dissimilarities between journals was the affinity propagation algorithm (Frey & Dueck, 2007). We also used the silhouette index to evaluate clustering quality and identify journals that were ambiguous between two clusters. Finally, the topical features of each cluster were obtained by averaging the feature vectors of journals belonged to the cluster.

In the experiment of subject category prediction, two tests were conducted. In the first test we used the IS&LS journals in the original subject category Management as positive examples input to the **classification and regression tree** (CART) algorithm. In the second test, the journals of the MIS cluster generated in the clustering experiment were used as positive examples. The generated classification trees as well as the prediction results of both tests were compared, with particular emphasis on the analysis of predicting errors.

Results

From the result of topic modeling in this study, we observed that the IS&LS journals cover a wide range of topics. There were two topics, “school library” and “publication and collections”, belong to the Library Science discipline. There were two other topics, “information retrieval” and “scientometrics and informetrics”, are known as important specialties in Information Science discipline. The remainders were the results created by the integration of Library Science and/or Information Science with other disciplines, such as “management”, “e-government and telecommunications policy”, “communities and social networks”, “geographic information”, “health information”, and “medical informatics”.

Ni et al. (2013) and Tseng and Tsay (2013) had also conducted experiments

of journal clustering in their study of topic identification or subfield delineation to the field of LIS. However, the features for representing journals, the methods for (dis)similarity estimation between journals, and the clustering algorithms used in this study and the previous two studies are different. In addition, the goals of this study were not only to identify the cluster composed of MIS journals, but also to expose the topical features emerging in the content of the journals and to analyze the journals' assignment of subject category Management. Using the affinity propagation algorithm, the IS&LS journals with similar topical features can be divided into groups. All the journals simultaneously that were assigned the subject category Management were sorted into the same cluster, and therefore, this cluster was considered as the MIS cluster in this study. The journals in this cluster and those in the MIS cluster in Tseng and Tsay (2013) and Abrizah, Noorhidawati, and Zainab (2015) were almost the same. The most distinct topical feature in the content of the journals in the cluster was "management". Those journals, which were included in the MIS cluster in the two previous studies but not in this study, were classified in another cluster related to the topic "e-government and telecommunications policy". It could mean that there were some relations between the two topics in both citation data and experts' images, but the texts in which the two topics appeared were very different.

Nowadays researches using supervised learning methods in the field of LIS are still rare. In this study, we used the techniques of CART to discuss whether the MIS journals which currently are not assigned the subject category Management should also be given with the subject category or not. The classification trees generated in the two experiments both used occurring probabilities of the topic "management", which was the most distinct topical feature in the positive examples of the training data, as the main classification rule to predict the assignment of subject category "Management" to the IS&LS-related journals. However, in the test of using the journals in the original subject category Management as positive examples, it needed to add some classification rules consisting of other topical features in order to exclude the journals which had also a higher occurring probability for the topic "management" but without the subject category "Management". These added rules introduced many predicting errors which resulted in the positive examples were predicted to be negative. In the test of using the journals in the MIS cluster generated in this study, the generated classification tree was much simpler and also brought less predicting errors. It was because the journals with higher occurring probability on the topic "management" were sorted into the MIS cluster. In summary, if the MIS cluster is used rather than the category of Management in the databases, the retrieval result of MIS journals will be more effective and complete.

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Research Article

The Effects of Teacher and Teacher-librarian High-end Collaboration on Inquiry-based Project Reports and Monthly School Test Scores of Fifth-grade Students

Hai-Hon Chen

Abstract

The purpose of this study was twofold. The first purpose was to establish an integrated instruction model with a high level of collaboration between social studies teacher and teacher-librarian. The second purpose was to investigate the effects of high-end collaboration on the inquiry-based project reports of individuals and groups, as well as monthly test scores of fifth-grade students. A quasi-experimental method was adopted, and two classes of elementary school fifth graders in Tainan City, Taiwan were used as samples. Students were randomly assigned to experimental conditions by class. The twenty eight students in the experimental group were taught by the collaboration of a social studies teacher and teacher-librarian; while the 27 students in the control group were taught separately by a teacher using a didactic teaching method. The Inquiry-Based Project Record, Inquiry-Based Project Rubrics, and monthly school test scores were used as instruments for collecting data. A t-test and correlation were used to analyze the data. The results indicate that: (1) High-end collaboration model between the social studies teacher and teacher-librarian was established and implemented well in the classroom. (2) There was a significant difference between the experimental group and the control group in the inquiry-based project reports of individuals and groups. Students that were taught by the collaborative method got higher inquiry-based project reports scores than those that were taught separately by a teacher. The experimental group's students got higher monthly school test scores than did the control group students as well. Suggestions about high-end collaboration for teachers and future researchers are provided in this paper.

Keywords: *Social studies teacher, Teacher-librarian, High-end collaboration, Inquiry-based project report, Monthly school test scores*

SUMMARY

Introduction

Capable teacher-librarians can help students develop reading abilities and information literacy, as well as lead students to get familiar with the

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research process (Chu, 2009; Chu, Tse, Loh, & Chow, 2011; Montiel-Overall & Hernàndez, 2012). Collaboration between subject teachers and teacher-librarians are based on advantages and expertise from both sides, for enhancing students' learning outcomes, standardized achievement test scores, and life-long learning abilities (Lance, 1994; Lance & Hofschire, 2011, 2012; Lance & Russell, 2004; Montiel-Overall & Adcock, 2007). This teaching collaboration model has been practiced in Western developed countries for decades. However, co-teaching between teachers and teacher-librarians in Taiwan is still at its preliminary stage, and is limited in a lower-level cooperation mode in which teacher-librarians only provide teaching resources for teachers to teach. The higher-level collaboration between teachers and teacher-librarians is still rarely seen in Taiwan (Chen, 2014). Therefore, this study is focused on the noteworthy topic of how to promote high-end collaboration between teacher-librarians and subject teachers.

Research Design and Implementation

There are two parts in this study: (1) the researcher as a university professor develops a high-level collaborative teaching model based on the process of providing relevant knowledge about social studies teaching, information literacy and procedures of collaborative teaching modes to teacher-librarians and social studies teachers, giving advice on the design of teaching materials, teaching and learning activities and evaluations, observing on-site teaching and learning, and giving feedbacks afterwards, and (2) the impacts of the collaborative teaching model on inquiry-based project report of individual students and small groups, and social studies monthly test scores are discussed.

Research design and study subjects

A quasi experimental method is adopted as the research design approach in this study. Fifth-grade students of two normal-grouping classes at a public elementary school in Tainan are chosen as the study subjects. Twenty-eight students are in the experimental group for participating in the social studies and reading classes under the teaching collaboration between a Social Studies teacher and a teacher-librarian. Twenty-seven students are in the control group to be taught separately by the subject teacher and the teacher-librarian, with the subject teacher adopting traditional lecture instructional method based on text books. The teacher-librarian uses the same method and instructional materials to teach the two reading classes.

Learning activity design and leaning resources

1. Learning activity design and procedures

The four stages of teaching framework for the experimental group include: (1) with a structured teaching method, the social studies teacher leads students to

get familiar with the content of instructional units, and students choose research topics to get involved in inquiry-based learning, (2) the teacher-librarian teaches students to search and retrieve relevant library and web resources on the chosen research topics, (3) the subject teacher and teacher-librarian teach students about reading comprehension strategies for comprehending retrieved resources, and guide students to further organize the resources for generating learning outcomes, and (4) through sharing each group's works of inquiry-based project reports, the subject teacher and teacher-librarian give feedbacks. These four stages of teaching and learning serve as the evaluation framework for inquiry-based learning project report, and the scores are added with scores of concept mapping to generate the total scores.

Students of the two classes are grouped with the S-heterogeneous method based on their scores of the previous semester for minimizing group differences. After students finish their individual inquiry-based project reports, they bring their reports to participate in group discussions, and then draw out the group's concept maps and finish writing reports. The students in the experimental group then share with each other their reports of inquiry-based learning project, and the students in the control group do not.

2. Learning resources

In addition to text books, students of both experimental and control groups also use informational children's trade books and databases to assist their inquiry-based learning.

Research instruments

1. Inquiry-based project record

Inquiry-based Project Recording Sheet help students record relevant data during inquiry-based learning project, include (1) a table for specifying research topics, (2) a KWHL table for students to construct their learning outcomes by clarifying their knowledge about topic concepts, how they know and the process of knowing, (3) a Data Collection and Organization table helps students record keywords, data sources and abstract contents of relevant resources, (4) a Comparison table helps students compare and organize at least three articles on the same research topic but with different data types, and (5) a Concept Map chart helps students organize concepts and write down abstracts and thoughts.

2. Inquiry-based project rubrics

Individual and group reports are used to evaluate whether students have equipped with knowledge and skills for conducting independent inquiries and working with peers. According to the four stages of the teaching and learning framework, the evaluation items include research topics, search and retrieval,

information comprehension, information organization, and concept maps. Each item is evaluated with a rubric consisting of descriptive phrases including Excellent, Good, Fair, and Poor, with points assigned to each description as 4,3,2,1, respectively.

Individual and group reports are graded by the Social Studies teacher and the teacher-librarian with the evaluation tool containing items of research topic, search and retrieval, information comprehension, information organization, and concept maps. The interrater reliability is .942. The final scores are the averages of the scores of the Social Studies teacher and the teacher-librarian each student's individual and group reports.

Results and Discussions

1. Impacts of Teaching Collaboration on Individual Inquiry-based Project Reports

The average score of individual inquiry-based project reports of students in the experimental group is higher than the ones in the control group. The value of Cohen's d is between .68 and 1.59. Except for Concept Map item, the rest of the evaluation items are with a high value of Cohen's d, indicating a significant effect of the experimental teaching and learning intervention.

2. Impacts of Teaching Collaboration on Group Reports

Except that the fourth group (researching on the Tapani Incident) earned a higher grade on the Concept Map item and thus got a higher score of group report than the experimental group, the scores of the other five group reports in experimental group are higher than the ones of the control group.

3. Scores of Inquiry-based Project Reports and Social Studies monthly test scores

The scores of Inquiry-based Project Reports have a low correlation with the scores of Social Studies monthly test scores in the second semester of fifth grade. The monthly test scores average difference of the experimental and control groups in the first semester of fifth grade was 1.25, but the average difference of the second semester is with a larger difference of 2.93.

Conclusion and Educational Implications

1. It is feasible to build a higher-level of teaching collaboration model between Social Studies teachers and teacher-librarians.
2. The higher-level teaching collaboration has enhanced scores of individual and group inquiry-based project reports in the experimental group, and the average score of Social Studies monthly test scores in the experimental group is higher than the one in the control group.

This study is an exploratory research about building a high-end collaboration

model between Social Studies teachers and teacher-librarians, with the guidance of a university professor. The significant contribution of this study is to investigate the feasibility of enhancing students' learning performance without increasing actual teaching and learning time, and thus is a useful reference for teachers who are interested in adopting teaching collaboration practices.

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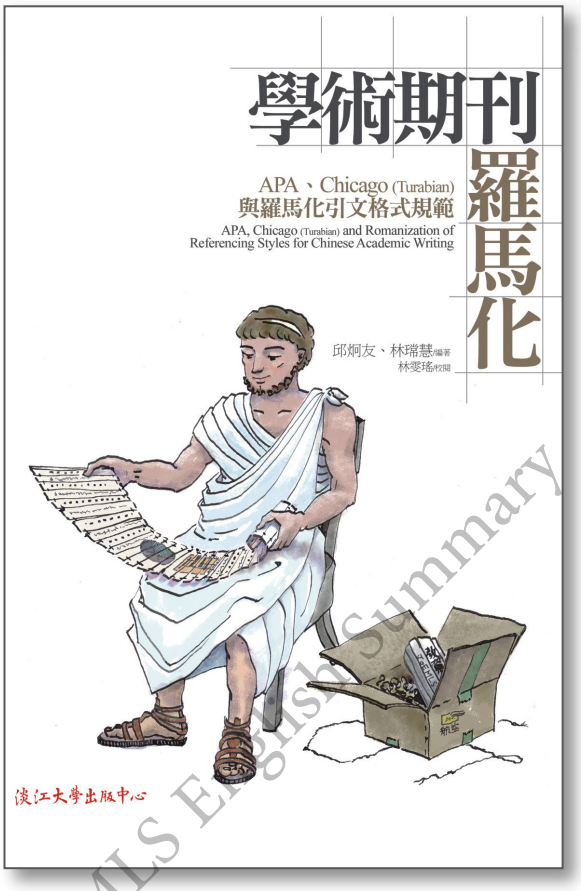

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