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Summa

# 教育資料與圖書館學

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# 教育資料與圖書館學

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# EDITORIAL

# An Earnest Request on Ethics of Academic Journal Publishing

Gate-keeping for academic ethics has always been an extremely important task of managing scholarly journals. The common actions violating academic ethics and causing harm to journal quality include multiple submission, omission or fabrication of citations, and plagiarism, etc. Other relatively invisible and special cases of violating academic ethics involve fake co-authors or fabricated original research data. As a journal editor who has been managing a decent and healthy academic publishing environment, it is essential to pay close attention to the common and special cases involving academic ethics. Even though it is not easy to actively inspect and discover malpractices in real situations, it is important to reminder manuscript submitters of following relevant regulations with an earnest and serious attitude.<sup>1</sup> This is the only way to protect rights of both sides (manuscript submitters and the editorial board), and to facilitate advocating educational issues on ethics of academic publishing.

Our Journal (JoEMLS) has already issued on our official website "An Announcement about Ethics of Academic Publishing", which addresses the three aspects of responsibilities of chief editor and executive editors, reviewers, and manuscript submitters, and also indicates relevant investigation processes and possible disciplinary actions that will be adopted by our journal. Due to the fact that some cases might involve issues of adducing evidence or violating privacy, it is important to handle such cases with extra caution, for not making wrong accusations and for identifying the actual malpractices. We deeply regret that in this issue (Issue 3, Volume 57), three manuscripts from Taiwan and overseas violated the standard regulations of academic ethics. These cases involved issues of multiple submission, suspected plagiarism, inappropriate citations, and citing of non-existent sources or contents. It indeed took a great deal of time, money and efforts to handle and investigate these recent cases. Despite this, we do not consider there is a general deterioration in the present academic environment. What worries us is the reckless attitude of scholars in Taiwan and overseas toward regulations of academic ethics. This recklessness might cause harm to their future development of academic career, and would damage the quality and reputation

<sup>&</sup>lt;sup>1</sup> See Jeong-Yeou Chiu, "Editorial: A Reflection on the Ethics and Disputes of Submitting Journal Manuscripts," *Journal of Educational Media & Library Sciences* 53, no. 2 (Spring 2016): 135-138.

of involved scholarly journals in a split second. It is fortunate that these real cases have been identified and held back before being accepted for publication; otherwise, the subsequent handling procedures and results would be more complicated and embarrassing.

We are fortunate enough to avoid such an embarrassing situation because we have been preparing with internal regulations regarding editing and publishing processes. For example, before all the manuscripts are accepted for publication, they must first go through a plagiarism detection system, and the repeated text paragraphs will be reviewed through another round of manual inspection. In addition, we rely heavily on reviewers as our gatekeepers who timely identify and report suspected cases, for preventing subsequent chaos.

In this issue (Volume 57, Issue 3), three research papers and one observation report are published. A total of 11 manuscripts went through the review process and seven were rejected, with a rejection rate of 63.6%. A stunning high number of 12 manuscripts were rejected before the review process, due to the fact that they did not follow our regulations on format and length, or the manuscript contents did not match the purpose and objective of our journal.

Our sincere gratitude is dedicated to the authors of manuscripts in this issue, including "Content Analysis of Library's Facebook Confession Page 'Kao-Bei Library'" by Jia-En Lee and Hao-Ren Ke, "Effects of Public Library Storytelling Activities on Children's Reading Literacy Development: From Caregivers' Perspectives" by Nien-I Chung and Hui-Yun Sung, "Development and Evaluation of Emotional Conversation System Based on Automated Text Generation" by Te-Lun Yang and Yuen-Hsien Tseng, and an observation report "Transformations of Bibliographic Data into Linked Data: Bibliographic Ontology, Linky MARC and Schema.org" by Ya-Ning Chen.

We deeply appreciate all the authors and reviewers of this issue who are willing to support and agree on the Open Peer Review (OPR) system promoted by our journal. We expect that future authors and reviewers will also support our OPR system, for making the quality manuscripts and review opinions open to the public as the standard, and non-public as exceptions.

Jeong-Yeou Chiu JoEMLS Chief Editor



# Content Analysis of Library's Facebook Confession Page "Kao-Bei Library"<sup>ψ</sup>

Jia-En Lee<sup>a</sup> Hao-Ren Ke<sup>b\*</sup>

### Abstract

The popularity of social media has changed how people communicate with each other and know about the world. Some social media provide the anonymous feature to increase the willingness of users to express their opinions, and confessions pages on Facebook are one kind of them. Confessions pages on Facebook are both popular and controversial. This study analyzes 1,080 posts on the Facebook confessions page "Kao-Bei Library" to explore user activities and post features. This study developed a coding scheme which includes the identities of posters, the purposes of posts, objects of complaints, and the identifies of librarians who were complained by other librarians. The result indicates that the frequency of posts has no differences between week days. The timing of posts bears a resemblance to people's daily routine. Most posters do not reveal their identities, while the most identified are librarians. Posts on the page are mainly complaints, followed by posts responding to previous posts. Each poster from different backgrounds has a unique trait in their words. The result can apply to organizational management, expecting anonymous social media to be considered as a tool to understand the relationships within an organization, thus pay more attention to the potential crisis. Also, this study provides suggestions for anonymous social media studies and librarian's human resource studies.

**Keywords:** Anonymous social media, Library anonymous social media, Facebook confessions page, Content analysis

# SUMMARY

# Introduction

Social media has been commonly used in today's society, and 89 % of population in Taiwan has engaged in activities of social networks. Among

<sup>&</sup>lt;sup>(1)</sup> This article was adapted from a master's thesis under Jia-En Lee "Content Analysis of Library's Anonymous Social Media: A Case Study of Facebook Confession Page 'Kao-Bei Library'".

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which, 89% of people have ever participated in Facebook activities (Hootsuite, 2019). Anonymous social media allows users who have concerns for the same issue to have a virtual space to communicate with each other in an anonymous manner and alleviate the pressure of users to post messages on controversial issues. The anonymous Confession Pages launched by Facebook are one kind of such anonymous social media. The issues discussed in the Confession Pages and the potential crisis lurking in the issues have drawn attention of researchers and organization managers (Barari, 2016; Krishna & Kim, 2015; Wabgchuk, 2018). In addition, people external to the organization involved in a Confession Page can understand the organization through the Confession Page, which make Confession Pages as one channel that influences the public relation of an organization. "Kao-Bei Library", which means "Complaining About Library", was one anonymous Facebook Confession Page created in Taiwan. It was established in June 12 of 2015, and as of November 9 of 2019, it had accumulated 2,380 likers and 2,451 followers. In this study, Complaining About Library page was studied and analyzed for its content and phenomenon of posts, in order to understand the features of posts and users' activities on this anonymous page.

## **Research Method**

In this study, the content of 1,080 posts appeared on Complaining About Library page from July 18 of 2016 to November 9 of 2019 was manually collected. For each post, its post ID, post message, submission date, engagement (share and comment), and Facebook emoticons (like, love, haha, wow, sad, angry) were collected. The content analysis approach was adopted as the major research method, and the grounded theory approach was used for developing data categories and coding. The research framework was consisted of four observed items, including disclosure of posters' identity (librarians, library users, others, unclear), goals of postings (complaints, responses, doubts and questions, information sharing, issue discussions, investigation/survey, suggestions, others, unclear), disclosure of complained subjects' identity (librarians, library users, work content, management policies, others, unclear), and identity disclosure in cases of librarians complaining about librarians (superiors, colleagues, part-time workers/subordinates, unclear). When coding the data regarding "disclosure of posters' identity", the poster's identity was judged from poster's direct identity disclosure or self-describing behaviors in posts. Direct identity disclosure refers to the poster announcing one's identity with clear words in postings. Selfdescribing behaviors in posts refers to the poster describing one's behaviors for revealing the true identity. When coding the categories of "goals of postings", "disclosure of complained subjects' identity", and "identity disclosure in cases of librarians complaining librarians", the posts were judged only from their literal meanings, for avoiding inaccurate interpretations. 110 posts were randomly picked from the 1,080 posts and coded by two independent coders, and the resultant Cohen's Kappa Coefficient for measuring inter-rater reliability was 0.857, which means the strength of agreement fell within the range of "Almost Perfect". After the inter-rater reliability had been confirmed, all other posts were coded by the first author of this paper.

### **Research Results**

The results of analysis revealed that the calendar day on which posters posted the most frequently was Monday (166 posts, 15.54%), followed by Wednesday (160 posts, 14.98%), Saturday (157 posts, 14.70%), and Thursday with the least posts (140 posts, 13.11%). The observed differences were insignificant. A further analysis with Test of Goodness-of-Fit was adopted to see if there were significant differences among the numbers of posts. The null hypothesis (H0) was defined as "the average number of posts on each calendar day is the mean", with the result  $x^2(6) = 3.64 < 12.59$ , failing to reject the null hypothesis at the 0.05 significance level. In other words, there were no significant differences among numbers of posts on different types on Twitter by Wang et al. (2016), which claimed that posts were with periodical changes. The difference might be resulted from different features and characteristics of user groups on different social media platforms.

As to the time period during which users posted the most frequent, it was the 22:00-22:59 period, with 81 posts (7.5%). And the 4:00-5:59 period was with the least posts. The Test of Goodness-of-Fit was conducted to see if there were differences among numbers of posts during each time period, with the null hypothesis defined as "the average number of posts during each time period is the mean". The result  $x^2(23) = 306.25 > 35.17$  rejected the null hypothesis at the 0.05 significance level, revealing there were significant differences among numbers of posts during each time period. The curves revealed in the result were relatively more matching to the daily routines of the public. It was worth noting that numbers of posts during the 9:00-0:59 time periods were higher than the mean, and only the 13:00-13:59 period was with a lower number (34 posts, 3.1%) than the mean. It was inferred in this study that this was related to the daily routines and work habits of posters on the Complaining About Libraries page.

59.35% of the users did not provide or hardly provided information regarding individual identification and behaviors, causing difficulties of person-identity recognition. Different goals of postings had influenced the degrees of posters' disclosure of self-identity. In posts aiming at affectionate communications,

posters would have a more comprehensive description of the whole events, and further disclosed one's identity. In posts focusing on information communication, posters would disclose one's identity less.

The largest group of posters who self-disclosed identity was librarians, followed by library users, and other identities, including examinees of Civil Service Examinations, applicants of library jobs, library volunteers, former librarians, librarians to take office, staff members of relevant organizations, and managers of the Complaining About Library page. It revealed that Complaining About Library page reached a variety of audience and had a certain degree of influential power, not limited to the audience of librarians and library users.

As to the goals of postings, the largest category was "complaints" (46.67%), followed by "responses" (28.43%), "doubts and questions" (7.59%), "unclear" (6.94%), "information sharing" (4.54%), "issue discussions" (1.48%), "investigation/survey" (1.3%), "suggestions" (0.93%), and "others" (2.69%). The "others" category included goals such as nostalgia, confession, gratitude, and apology. In the Complaining About Library page, posters of different degrees of self-identity disclosure also had different features of post contents. For those posts without clear disclosure of self-identity, the categories of goals of postings included responses (42.59%), complaints (23.56%), unclear (11.54%), doubts and questions (9.05%), information sharing (7.02%), investigation/survey (1.56%), and others (4.68%). Posts of posters who self-disclosed as librarians were with goals including complaints (82.8%), responses (8.2%), and doubts and questions (5.03%), among others. Among the category of complaints, the types whom librarians complained about included library users (40.58%), librarians (38.66%), work content (8.63%), and management policies (7.67%). Those librarians complained by self-disclosed librarians were superiors (62.1%), colleagues (27.42%), unclear (9.68%), and part-time workers/subordinates (0.81%). Selfdisclosed library users posted with goals of complaints (78.26%) and responses (6.52%), among others. The subjects most frequently complained by selfdisclosed library users included librarians (47.22%), other library users (44.44%), and management policies (2.78%).

# Conclusions

For improving library services, it is suggested that libraries should view anonymous social medial groups as a channel for understanding relevant personnel. From the fact that almost half of posts on Complaining About Library page were "complaints", we can see that users tended to express their emotions through anonymous social media channels, instead of directly complaining to libraries. The opinions expressed through anonymous social media channels should be treated with discretion. In this study, with the grounded theory approach, the researcher developed a research framework with four observed items, disclosure of posters' identity, goals of postings, disclosure of complained subjects' identity, and identity disclosure in cases of librarians complaining about librarians. It is suggested that researchers of future studies could use this study as a foundation to develop a theoretical framework for investigating posts in anonymous social media groups regarding libraries, such as analyzing and categorizing relevant library policies, responsibilities and services referred and implied in posts.

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# Effects of Public Library Storytelling Activities on Children's Reading Literacy Development: From Caregivers' Perspectives<sup> $\psi$ </sup>

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### Abstract

This study aims to explore effects of children's regular participation in public library storytelling activities on their reading literacy development from the perspectives of caregivers, storytellers, and librarians. This study was qualitative in nature, taking place at four public libraries in Taichung that regularly held storytelling activities. Interviews and observations were used for data collection. Study participants included 42 caregivers, 10 storytellers, and four librarians. Results of this study show that roles that caregivers played in accompanying children during library storytelling activities varied from high to low levels of frequency, including: company, spectators, caregivers who waited, and tutors. In addition, children's early literacy skills (such as oral language, phonological awareness, orthographic awareness, vocabulary, print awareness, and background knowledge) were reported to improve through library storytelling elements that included speaking, singing, reading, and playing.

*Keywords:* Public libraries, Storytelling, Reading literacy, Early literacy, Qualitative research

### SUMMARY

# Introduction

Surrounding environments and experiences have played an important role in promoting children's development, and have impacts on children's brain development (National Reading Panel, 2000; National Scientific Council on the Developing Child, 2007). Every child deserves an environment that promotes his or her language development, and writing and reading abilities (Snow et al., 1998). In communities, public libraries could provide equal services for

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motivating children's creative learning, and could serve as educational centers for developing early literacy skills of reading and writing (Acord, 2017). The second edition of Early Child Ready to Read (ECRR), issued in 2011, advocates supporting young children's oral language, phonological awareness, letter knowledge, vocabulary, print awareness, and background knowledge, through five practical activities of speaking, singing, reading, writing, and playing; it also addresses clearly how caregivers could support early literacy skills of reading and writing in daily life (Ash & Meyers, 2009).

Most of the relevant studies on investigating the relationships between public libraries and early literacy skills focus on viewpoints of librarians and young children, but rarely address the perspective of caregivers. However, caregivers have played an indispensable role in young children's early literacy, and many studies suggest parent-child shared reading helps develop early literacy (Heath, 1983; Teale, 1986). In addition, storytellers and librarians also play an important role, because storytellers lead the storytelling activities, and librarians could work as bridges between storytelling activities and caregivers. Thus in this study, through the perspective of caregivers, as well as viewpoints of storytellers and librarians, the researchers investigated how regular participation in public libraries' storytelling activities has an impact on children's early literacy development.

# Methodology

In this study, the qualitative approaches were adopted, with interviews as the major approach of data collection, and observations as the assistive one. The purposive sampling was used to recruit 42 caregivers, 10 storytellers and four librarians from four public libraries in Taichung holding regular storytelling activities in this study as the study subjects. Qualitative content analysis and thematic analysis were adopted for data analysis in this study of investigating the real situations of young children and caregivers participating in public libraries' storytelling activities, with the focus on the roles of caregivers when accompanying young children to participate in storytelling activities of public libraries, and the impacts of public libraries' storytelling activities on young children's early literacy.

# **Results and Discussion**

It was found in this study that the criteria with which caregivers used to choose storytelling sessions included services provided by libraries, and themes and contents of stories. Some caregivers reported that as long as their young children did not reject libraries' storytelling activities, they would take young children to participate in those activities when time permitted; they even followed the sessions in which their young children's favorite storytellers hosted. The study results revealed the different roles of caregivers when accompanying young children in public libraries' storytelling activities, including company (54.76%), spectators (28.57%), caregivers who waited (11.90%), and tutors (11.90%), respectively. Caregivers who considered accompanying young children to participate in storytelling activities and to follow storytellers' instructions could promote the parent-child relationships. Caregivers as spectators would observe young children's behaviors and reactions, but would not intervene in storytelling activities; this type of caregivers expected that young children could learn to be independent through participating in storytelling activities. Caregivers who waited were a type of roles categorized and labeled by the researchers of this study; caregivers who waited would neither intervene in storytelling activities nor observe young children's behaviors and reactions, and would just use their smartphones, read books or borrow library books. Compared with the types of caregivers reported in previous studies, including caregivers as guides (Howard & Wallace, 2016) and caregivers as teachers (Reese et al., 2010), in this study, caregivers as tutors were identified. Caregivers as tutors expected that with appropriate instructions, young children would engage more in storytelling activities and comprehend more easily the content of stories.

Furthermore, the results of this study revealed that through the designed activities of public libraries' storytelling, including speaking, singing, reading and playing, young children would develop their early literacy skills, including oral language, phonological awareness, orthographic awareness, vocabulary, print awareness, and background knowledge. The results regarding background knowledge revealed that most study subjects emphasized the importance of young children learning about the general knowledge mentioned in ECRR (2nd edition), including social norms, etiquettes, moral characters, and daily routines. Compared with the storytelling activities of public libraries in the United States, the writing practice was not utilized for promoting early literacy in the storytelling activities of the public libraries observed in this study.

### Conclusion

In this study, through the perspective of caregivers, the researchers investigated the impacts of young children participating in public libraries' storytelling activities on their early literacy development. The goal was to fill the research gap of focusing mainly on young children and libraries in previous studies. The results of this study revealed that caregivers' accompanying young children to participate in regular storytelling activities of public libraries would help advance young children's early literacy skills. It is suggested that public libraries should pay more attention to caregivers' participation degrees and frequencies in storytelling activities, for supporting young children's early literacy development. In addition, libraries could consider offering training courses on early literacy practices and child development, for enhancing storytellers' and librarians' conceptions, knowledge and skills regarding storytelling activities. For future studies, it is suggested that experimental or quasi-experimental research design could be adopted to compare the processes and outcomes between storytelling activities hosted by storytellers who ever received and who never received professional training, for investigating whether the storytelling training programs would enhance the overall quality of storytelling activities. Quantitative methods could be used to evaluate the influences of libraries' storytelling activities on young children's early literacy development; with large amounts of data, it would generate more comprehensive study results. In addition, it is suggested that through collecting and analyzing worksheets or lesson plans designed by storytellers, future research would help identify the relationships between materials chosen and activities designed by storytellers, and young children's early literacy development, with the ultimate goal of further understanding the influences of public libraries' storytelling activities on young children's early literacy development.

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# Development and Evaluation of Emotional Conversation System Based on Automated Text Generation $^{\Psi}$

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## Abstract

Based on the corpus provided by the 2019 Chinese Emotional Conversation Generation (CECG) evaluation task, an emotional conversation system is implemented in this paper using deep learning and other technologies such as GPT-2 and BERT. The effectiveness of the system is evaluated based on the test data and criteria provided by CECG. The results based on three human annotators show that the system has a similar effectiveness level with that of the best team participating in the 2019 CECG task. Further case studies reveal that the more post/reply pairs about a topic in the training data, the better the language model of GPT-2 to generate innovative, interesting, and perfect response sentences for that topic. The main contributions of this study are: 1. Integrating emotion into the post string as a condition for computing probability, so as to simply train GPT-2 and make GPT-2 predict in the original way; 2. Applying BERT to predict the coherence of response sentences as a basis for ranking. Although these two techniques are derived from the training mechanisms of GPT and BERT respectively, we have slightly modified them to fit the task of CECG and achieved good results.

**Keywords:** Conversational system, Text generation, Text understanding, Deep learning, Artificial intelligence

# **SUMMARY**

# Introduction

In human-computer interaction, automatic recognition of human emotions for appropriate response can make human-computer interaction smoother and more effective. Related research shows that the expression of empathy can increase user satisfaction and promote positive interaction.

 $<sup>^{\</sup>psi}$ Both authors have the same contribution. Te-Lun Yang implemented the whole system, while Yuen-Hsien Tseng proposed the solution and complete the paper writing.

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In pursuit of the above delicate interaction, this paper presents the building of a Chinese dialogue system that emphasizes on emotional conversation using state-of-the-art AI techniques, namely Generative Pre-trained Transformer (GPT) and Bidirectional Encoder Representations from Transformers (BERT). This emotional conversation system (ECS) is expected to respond to a user's post with a fluent and coherent reply conforming to a specified or detected emotion.

## Problem

Specifically, this paper adopts the datasets and evaluation criteria from the Chinese Emotional Conversation Generation (CECG) Shared Task held in Short Text Conversation Task (STC-3) in the 14th NTCIR Workshop (2018-2019) to train the proposed system and evaluate its performance.

The CECG task is defined as: for a user input post, the system needs to output a response (or reply) with a specified emotion category of which there are 5 types of emotion: Anger, Disgust, Happiness, Like, and Sadness. A possible example of the post/reply is as follows:

User's post: My cat died yesterday.

System reply (given a specified emotion type in the squared bracket):

[1: like] Oh she likes to make believe. That's cute.

[2: Sadness] Oh, I'm so sorry for your loss.

[3: Disgust] That's fine. That would save you a lot of trouble.

[4: Anger] Was it killed? Let's find out who did it!

[5: Happiness] How fortunate! She's an angel now in heaven.

Note that in this imaginative example, the user's post may express sadness, it is rather difficult to make a like response, even for human.

The datasets provided by the CECG Shared Task are based on the pairs of posts and responses of Weibo users mainly from mainland China, with a total of about 1.7 millions of pairs (about 1.1 millions of pairs in 2019 and about 600,000 in 2017). For each post or replied text, a machine classifier was trained to label the emotion type of the text, and its accuracy is about 62%.

The CECG Shared Task evaluates each reply based on the post and the specified emotion, by human, according to the following criteria:

IF Coherence and Fluency IF Emotion Consistency LABEL 2 ELSE LABEL 1

ELSE

LABEL 0

Note that Coherence means that the reply is consistent with the topic of the post, Fluency means that the reply text is smooth and grammatically correct, and Emotion Consistency denotes that the reply's emotion is consistent with the specified emotion.

# Method

The developed ECS system consists of a user interface, a GPT-2 model for text generation, and a BERT model for text understanding and coherence prediction. The ECS takes input post from users through a Web API (or Web UI). An open source GPT-2 Chinese model was trained to output k candidate replies. These candidates were further ranked by a Chinese BERT model trained to predict the coherence of the reply based on the post. The highest ranked candidate was then chosen as the output reply.

The training data from CECG were in the form: [[post\_i, post\_i\_emotion], [reply\_i, reply\_i\_emotion] ]. They were converted into the form: ["post\_i [reply\_i\_emotion] reply\_i"] so as to conform to the training data format of GPT-2. In other word, the CECG problem asks us to predict the reply based on two conditions:

P(reply [post, emotion])

By concatenating the two conditions into one string, we reformulated the problem into the original language model learnable and predictable by GPT-2:

P( reply | "post [emotion]")

The GPT-2 was trained on a Titan RTX GPU with 24GB RAM. It took approximately 200 hours to train the 1.7 millions of post/reply pairs for 100 epochs.

The GPT-2 can be configured to output k candidate replies. To rank these candidates, a Chinese BERT pretrained model from Google was downloaded and fine-tuned on part of the original training data with the following format for coherence prediction:

```
[
[ post_1, reply_1, 1.0 ],
[ post_3, reply_7, 0.0 ],
[ post_8, reply_8, 1.0 ],
[ post_9, reply_2, 0.0 ],
....
```

In other words, the BERT model was trained to do linear regression prediction: if the input is the original post/reply pairs from the training data, the desired output has a score of 1.0; if the input is the scrambled post/reply pairs, the desired output is 0.0 to indicate that the post and reply are not coherent. The BERT model was fine-tuned on 15,000 pairs for one epoch (about 3 minutes), in which paired and scrambled post/reply are 50% each.

# Findings

Based on the evaluation criteria of the CECG Shared Task in 2019, the evaluation of 1,000 ECS generated replies by three native speakers majored in Chinese linguistics indicated that 90.3% reply texts are grammatical correct, and 59.1% are coherent to the posted text, and about 88% reply sentences are novel (not in the 1.7M training texts). This result outperformed the top-ranking system in the 2019 task, where a hybrid method of using both text generation and rule-based mechanisms was applied. Further case studies revealed that the ECS could generate innovative, interesting, and perfect response sentences for popular topics in the training data.

As an example, for the post stated "I would like to be with you forever," example replies would look like: "I would also like to be with you forever." if the specified emotion is "Like"; and "Why do you have to stay with me? It's not fair!" if the specified emotion is "Disgust".

More exploration of the ECS showed that, If the topic of the post is rich in the training data, the GPT-2 can generate creative sentences; if the topic of the post is relatively scarce in the training data, the smoothness and topic coherence of the generated sentence will diminish. These results are similar with conclusions from previous studies.

## Conclusions

The main contributions of this study are: 1. Integrating emotion type into the post text as a single condition for language modeling, so as to train and apply GPT-2 in the original way; 2. Applying BERT to predict the coherence of response text for ranking the generated replies. Although these two techniques are derived from the training mechanisms of GPT and BERT, respectively, we have slightly modified the techniques to fit the task of CECG and achieved good results.

This work sheds light on the pursuit of delicate human-computer interaction with emotion. Future work is needed to achieve the goal of better response texts (through better language modeling or larger training dataset) and to propose effective response strategies to yield proper emotional reply once a corresponding emotion was detected in the post.

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# Transformations of Bibliographic Data into Linked Data: Bibliographic Ontology, Linky MARC and Schema.org

Ya-Ning Chen

### Abstract

With advancement and application of linked data, it has become an issue how to transform existing MARC data into linked data in libraries. This paper aims to address three transformations from MARC into linked data in terms of evolutionary development of linked data in libraries. Eight tasks mainly borrowed from W3C' Linked Data Cookbook have employed as a framework to analyze the cases of three approaches used in library for linked data transformation as follows: British National Bibliography of British Library and Bibliothèque nationale de France for batch transformation, Share Virtual Discovery Environment for linky MARC and Library Link Network for Schema.org. As a result, initially the transformation in libraries has focused on triplification of linked data. Later, libraries has emphasized on how to deliver linked data driven information services and expose linked data based bibliographic data for increasing the visibility indexed and value added by search engines.

Keywords: Linked Data, Bibliographic Ontology, Linky MARC, Schema.org

### SUMMARY

# Introduction

Typically, MAchine-Readable Cataloging (MARC) is regarded as an international standard for information organization and exchange format between library automated systems. However, with the advancement of Linked Data (LD), libraries have started to transform existing MARC records to LDs. Various cases and approaches have been adopted for these transformations, but no study has addressed existing transformation approaches and their purposes, functions, results and related issues as a decision-making reference for libraries.

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# **Literature Review**

During the transformation of MARC to LD, libraries have to process MARC and LD at the same time. Therefore, some libraries including the British Library (BL), Sweden's LIBrary Information System (LIBRIS), Bibliothèque nationale de France (BNF) and Deutsche National Bibliothek (DNB) have transformed their bibliographic data to LD in a batch. In the United States, BIBFLOW (UC Davis University Library) and Tracer Bullets (Stanford University Libraries), part of the LD for Production (LD4P) project, have addressed the transformation workflow for MARC and non-MARC records. These projects in libraries have focused on how to transform MARC-based bibliographic data to LD in terms of information organization, especially with regard to the adoption of bibliographic ontology (such as FRBR and BIBFRAME) for data modelling, reuse of existing LD vocabularies, human- and machine- readable LD description and RDF conversion and instances for LD. On the other hand, some libraries in Taiwan have focused on the development of their workflow for LD transformation in terms of software design, as presented by Tseng (2014), Fu and Ke (2017) and Chang (2019). Overall, these software conversion-oriented approaches are mainly focused on the construction of an LD platform, particularly focusing on URI design, SPARQL end-to-end point query, LD export format, selection and alignment of ontology, reuse of more than two existing vocabularies.

Several issues related to LD transformation can be categorized as follows:

- It is important to select an existing ontology or develop a new ontology for LD data modelling. It seems that libraries have shown a preference for the former not the latter.
- There is no common agreement on a standard approach to selecting an appropriate ontology in libraries during transformation.
- In addition to naming each thing with an individual URI, the category of URI pattern is varied in practice.
- It is not an easy task to reuse existing vocabularies for LD. Furthermore, the issue of interoperability will arise from mashing up more than two sources of existing vocabularies.
- Linking with external LD resources has become a challenging issue, in particular, librarians are not familiar with LD's description and format.
- LD can aggregate various contextual information through URI linkages to external resources.

# Methodology

The cases of BL, BNF, Library Link Network (LLN) and SHARE Virtual Discovery Environment (Share-VDE) were used to investigate three LD choices

(i.e., bibliographic ontology, schema.org and linky MARC) for libraries according to research parameters mainly adopted from the LD Cookbook (Hyland & Villazón-Terrazas, 2011). The parameters were as follows: model the data, name things with URIs, reuse vocabularies whenever possible, publish human and machine readable descriptions, convert data to RDF, specify an appropriate license, host linked-data publicly and announce it, link to external LD resources, contextual information and knowledge graph.

## Discussion

Investigation of the four cases for the three LD choices showed that most results conform to LD requirements proposed by the W3C's LD Cookbook and each case has implemented LD transformation with specific features.

- Deployment of LD modeling classes and properties. All classes and properties used by four cases can be displayed, but only classes can achieve link-based resource discovery.
- Usage pattern and policy of URI naming. BL, LLN and Share-VDE have adopted classes of a bibliographic ontology as a category for URI naming, such as person, organization, topic and so on. On the other hand, BNF uses ARK directly for URI naming.
- Type of reusing existing vocabularies. Two types can be generalized as follows:

   the use of existing vocabularies from existing ontologies or metadata element sets for LD data modelling;
   use existing vocabularies as a linkage to specified external LD resources.
- Linking to external LD resources. Four types can be generalized as follows: 1. external LD are treated as hypertext linkage; 2. a union catalog is created seamlessly through the aggregation of LD; 3. providing cross-database query according to the URI linking; 4. aggregation of LDs as a knowledge graph or information card service for users.
- Principle and best practice guidelines in using external LD resources. More knowledge and skills are required of librarians when creating linkage to external LD resources, including information organization, familiarity of reference resources and user requirements. However, a best practice for guiding the development of linkages to external LD resources is still lacking, especially for the LD identification and selection.
- Parallel strategies in libraries. Two possibilities were observed: 1. Leave MARC data intact; 2. transform MARC to LDs. The second strategy has two benefits: (1) enriches existing bibliographic data with more contextual information through pulling external LDs into the catalog; (2) pushes

transforming bibliographic data to LDs as part of index and query of web search engines.

# Conclusion

In terms of the information flow and application, the BL simply transforms bibliographic data to LDs in a batch. In contrast the Share-VDE has not only provided an LD-driven catalog, but also combined and consumed external LD resources as a service-like knowledge graph or information card. The LLN has played a provider role in transforming bibliographic data to LD as part of web of data. Overall, only the BNF is both LD consumer and provider. However, which approach is a suitable choice for LD transformation would require cost-benefit analysis by individual libraries.

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