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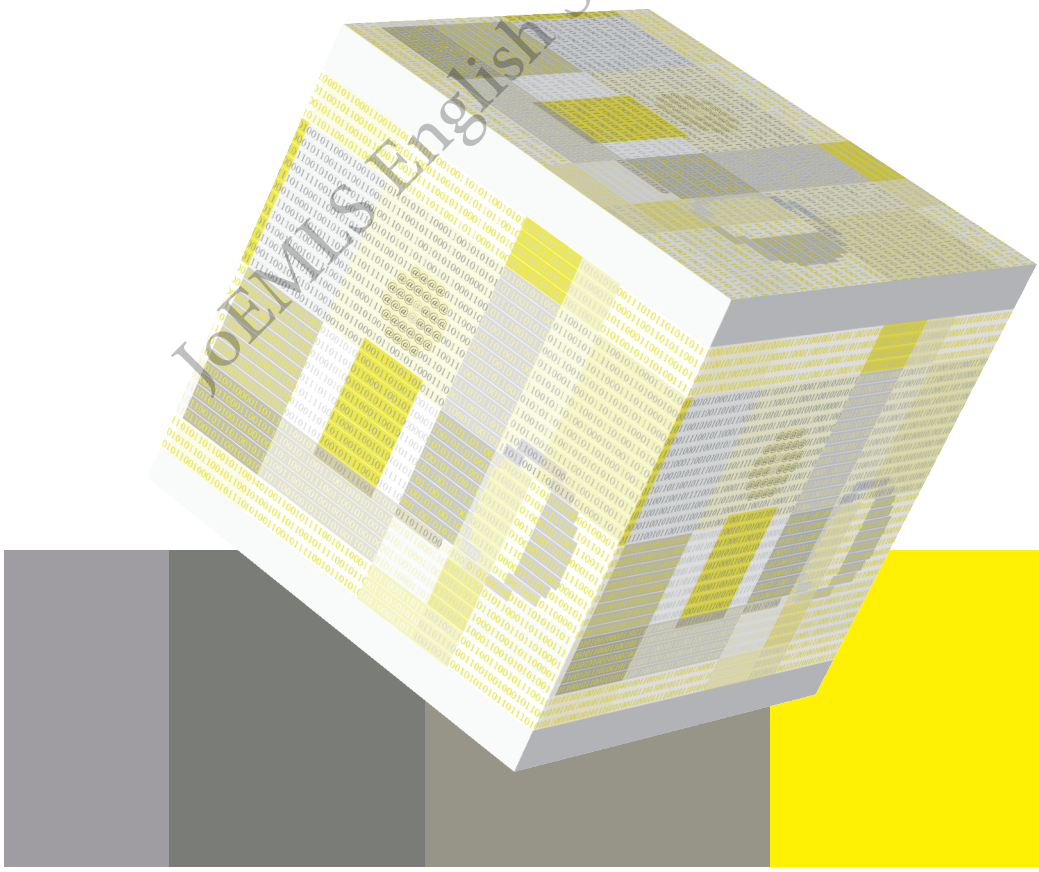

淡江大學出版中心

教育資料與圖書館學 JOURNAL OF EDUCATIONAL MEDIA & LIBRARY SCIENCES Vol. 56, No. 1, 2019

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，並改以季刊發行。自1982年9月起易今名。另自2016年11月起，改以一年出版三期（3月、7月、11月）。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). In 2015, The *JoEMLS* is acknowledged as the A class scholarly journal in Taiwan by Ministry of Science and Technology (MOST). Since November 2016, the *JoEMLS* has been changed from quarterly to a tri-annual journal, published in March, July, and November.

The *JoEMLS* is indexed or abstracted in

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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
JOURNAL OF EDUCATIONAL MEDIA & LIBRARY SCIENCES

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。

Open Access 典藏政策

*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：

⑴勿將已刊登之修訂稿（post-print）再自行轉為營利目的之使用；

⑵典藏版以期刊排印之PDF檔為首選；

⑶任何稿件之典藏版本皆須註明其與*JoEMLS*之關係或出版後之卷期出處。

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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The *JoEMLS*, as a role of "OA green publisher/journal", provides free access onlined to all articles and utilizes a form of licensing, similar to Creative Commons Attribution license, that puts minimal restrictions on the use of *JoEMLS*'s articles. The minimal restrictions here in the *JoEMLS* are:

(1) authors can archive both preprint and postprint version, the latter must be on a non-commercial base;

(2) publisher's PDF version is the most recommend if self-archiving for postprint is applicable; and

(3) published source must be acknowledged with citation.

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EDITORIAL

We as the Taiwan Vanguard of Journal with Open Peer Review

In the former Editorial of Issue 1, Volume 55 (2018), we have proposed three questions regarding the development of open peer review (OPR). What is the feasibility of applying OPR to journals in the field of social sciences, including library and information science? Do vendors of academic information value-added systems or databases have the willingness to get involved in the development and services of OPR systems? Are scholars in humanities and social sciences willing to change habits and break with tradition, and accept new challenges of OPR?

The OPR has not yet been given a unified name and a universally identical definition. OPR has also been termed as "public peer review", "transparent peer review", and "advanced open peer review". In terms of common features, OPR are termed as "signed review", "disclosed review", "transparent review", "editor-mediated review", and "crowd-sourced review". For another three attached features, OPR are also called "synchronous review", "pre-publication review", and even "post-publication review".[1] These features above indicate the innovative aspect of OPR in breaking with traditional modes, especially the new mode of "crowd-sourced review", suggesting that chief editors of journals can recruit numerous scholars and experts for undertaking the task of manuscript review, through a network platform that incorporates new media technologies and equips with a real-time, interactive and transparent mode of being able to verify all OPR tasks. However, not all of the features mentioned above are necessary to be included in one OPR system. The implementation of OPR varies with different management modes of journals. Each feature is allowed with a certain degree of creativity, and the implementation of OPR is allowed with differences of depths. When to open (timeliness) and how to open (democratic authorization and technical conditions)? These questions are for all of scholars and journal editors to contemplate. Solutions to problems should respond to calls for ideal and practical considerations, and people who take charge should select or design the most appropriate management mode for their own journals.

The general requirements for the OPR system of journals are described below.

[1] Emily Ford, "Defining and Characterizing Open Peer Review: A Review of the Literature," *Journal of Scholarly Publishing* 44, 4 (2013): 311-326. See also the information at https://pdxscholar.library.pdx. edu/cgi/viewcontent.cgi?article=1000&context=ulib_fac.

1. The identity information of peer reviewers should be open, contrary to traditional double-blind or single-blind modes that hide identities of peer reviewers.

2. No matter it is a pre-publication or post-publication review mode, after the review procedure is terminated, contents of peer reviewers' opinions should be open together with published manuscripts.

3. The open access (OA) mode should be adopted, and articles should be published online for interested readers to add comments to articles. However, contents of readers' comments are not necessary to be regarded as the basis of formal reviews of academic contents of manuscripts. It is to provide a channel for authors and readers to communicate with each other.

It is worth noting that the three requirements mentioned above could be independently used, or applied with different combinations. No matter what the combination is, in a broad sense, it could be termed as "Open Peer Review". In addition, from the perspective of epoch revolution, OPR system is indeed highly relevant to the open access mode, but even profit-oriented journals with a non-open-access mode could possibly adopt partial features of OPR and develop their publishing strategies. In other words, the point of OPR lies in the open and blind aspects, not in presenting confronting thoughts. Any design mechanism that respects the free wills of authors and reviewers, makes the review process open and transparent, promotes positive academic talks with assistances of technologies and media, guards academic quality and takes responsibilities of academic communication, could be regarded as an open-minded and trust-worthy OPR system.

Our *JoEMLS* takes a positive and serious stance toward the development of OPR in future's academic journal publishing in Taiwan, and we will certainly be in the vanguard of the OPR trend. In the future if scholars and chief-editors of journals could apply various added values of open peer review, such as Digital Object Identifier (ODI), Open Researcher and Contributor ID (ORCID), and Altmetrics, we have good reasons to believe the academic field in Taiwan is certainly to generate or accept the development and application of this kind of new platforms. No matter from the literature review of domestic and overseas applications of OPR platforms, or from analysis of 2018 surveys conducted by *JoEMLS* team that sent to more than one hundred scholars who ever reviewed manuscripts in Chinese for *JoEMLS*, and results of interviews with chief-editors of journals in library and information science field in Taiwan, we obtained similar findings. In the premise of respecting the willingness of relevant authorities, it is expected and feasible to design OPR solutions that are with characteristics, human

nature, and expediency. There obviously has no fixed modes of OPR systems, and we found plenty of innovative measures. With the spirit of innovation, revolution and experiments, our journal will not hesitate to continually promote and improve application modes of OPR, and usher journals of humanities and social sciences in Taiwan toward a new epoch of OPR.

In this issue (Issue 1, Volume 56), thirteen manuscripts have been reviewed, and four of them are accepted and published, with a rejection rate of 69.2%. The articles published in this issue include "The Maturity Assessment of the Recent Open Data Development in the Context of Taiwan E-Government" by Tung-Mou Yang and Yi-Jung Wu, "Does the Learning of Computational Thinking Concepts Interact with the Practice of Digital Curation in Children? A Preliminary Case Study" by Chun-Hao Chang, "An Application of ePUB3 eBooks to the Design and Teaching of Flipped 'Applied Writing' Courses: An Example of 'Abstract Writing' " by Tina Pingting Tsai, Chingsheng Hsu, and Jyhjong Lin, and "Quality Discussion and High-Level Comprehension: An Analysis of Taiwanese College Students" by Hsiao-Ling Hsu, Hao-Jan Howard Chen, and Wei-Tin Lin. There are many good articles left out. There are also many wonderful contents of academic criticism, reflections and debates that are not able to be shared. Some of these non-published academic publishing processes and debates are not less thought-provoking than published contents. If not with the clever application of OPR system, these wonderful insights can be only left in the memories of involved parties and archives of chief-editors of journals. We thank all of the authors who submitted manuscripts. No matter the manuscript is accepted or rejected, each author is a respectable scholar.

Jeong-Yeou Chiu
JoEMLS Chief Editor

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Research Article

The Maturity Assessment of the Recent Open Data Development in the Context of Taiwan E-Government

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Abstract

Open government data has become an important policy among the government administrations around the world. Similarly, in this global movement, both central and local governments of Taiwan have dedicated efforts and resources to establish open data infrastructure. Nevertheless, because of their respective information environments, agencies possess different capabilities of open data implementations, and different outcomes are achieved. Accordingly, this research adopts and refines an open data maturity model from the literature for the assessment purpose. A quantitative approach by using survey is employed to assess the current development and implementation of open data among Taiwan government agencies. The research also attempts to explore whether central and local government agencies possess similar or different capabilities and commitments in implementing open data. It is expected that the research results can provide insights to practitioners for related policy suggestions and resource allocations. Lastly, this investigation in Taiwan e-Government can also enrich and contribute to the current open data literature from an international perspective.

Keywords: *Open government, Open data, Evaluation, E-government*

SUMMARY

Open Government Data (OGD) has become a concerned issue in recent years, and been regarded as one of important administrative policies of domestic and foreign governments. Making data of public sectors open to the public helps achieve goals of transparency in government and public participation, and encourages innovative application of government data by the public, for promoting economic growth and new industrial development. OGD is expected to lay the foundation of open government by realizing its three pillars, including transparency, participation, and collaboration. However, the progress of open data of different sectors varies. Therefore, the goal of this study is to study the status

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quo of open government data in Taiwan, and to investigate questions addressed below. What are the executive capacities and commitment levels of government sectors in making government data available to all? Is there any difference of executive capacities and commitment levels of different government levels (the Central Government agencies, Six-Municipal Government agencies and local government agencies) in making data open to the public?

In this study, the Open Data Maturity Model proposed by Solar, Concha, and Meijueiro (2012) was adopted for developing survey questions, which were categorized into eight sub-aspects under the three major aspects, including (a) strategy, leadership and establishment, (b) laws and regulations, (c) management in the Establishment and Legal aspect, (d) data availability, (e) data access, (f) data format and content in the Technology and Data aspect, and (g) reuse encouragement, and h. participation and collaboration in the Data Reuse and Citizen aspect. During the data collection stage, the questionnaires were distributed to 666 government agencies of Taiwan for collecting empirical data. The duration was about one month, and the received valid questionnaires for analysis were 436. Both descriptive and inferential statistics were conducted by using SPSS software.

Results of this study showed that most of the Central and Six-Municipal Government agencies had engaged in making data open to the public, but many local government agencies had not participated yet. Some local government agencies made data open not long ago, and needed help in knowing how to promote open data policies, as well as encouragement for persisting in participation. As to the Law and Regulation aspect, most agencies followed the internal and external laws and regulations, and developed clear use authorization policies. Most agencies' open data strategies were in accordance with policies of the Central Government. However, the higher-level officers of these agencies should enhance their understanding of open data, and the communication and coordination among agencies should be enhanced. In addition, many agencies had not incorporated open data into their existing business, and had not built up a corresponding standard operating procedure yet. The concept of open data is also relatively new for some government officials, and they usually have limited understandings and experiences in searching and aggregating datasets. The process of data de-identification to reduce the concern of privacy impact is also not an easy task. Agencies should help provide and enhance educational training of required skills for relevant personnel in open data implementation.

As to the Technology and Data aspect, most agencies had used open data portal (ODP) or application programming interface (API) for providing open data, provided appropriate descriptions of metadata, adopted a non-proprietary

data format, and kept follow-up maintenance of open datasets. However, many agencies did not open all of the owned datasets, and would re-produce and incorporate the datasets before making them open to the public, that is, they did not open the raw datasets they collected in the first place. Those agencies were also unfamiliar with the application of linked data. This empirical result reflects that the implementation of 4-star and 5-star open data is still difficult for most of the agencies while they possess limited technical capabilities, and the standard of 3-star open data is a more reasonable expectation for most agencies to achieve at this time.

Lastly in the aspect of Participation and Collaboration, many agencies hadn't built up a mechanism for responding to and handling problems regarding data access, and had limited commitment in encouraging the pubic to use data. Only a few agencies adopted approaches of budget rewards. There is still room for enhancing agencies' building up communication channels of open data policies and their activeness in responding to relevant questions. It is expected that feedbacks from open data users can actually help government agencies improve the qualities of their released datasets.

There was a similar trend of individual responses among the Central, Six-Municipal and local government agencies. The major difference lied in the response strength. As to the overall evaluation of response strength, the Central Government agencies had the highest maturity, followed by the Six-Municipal and local government agencies, respectively. In addition, it is worth noting that there were no significant differences among the three types of government agencies in the issues of completely opening collected and produced datasets, applying linked data technology, opening raw/not reproduced datasets, holding activities for encouraging the public to use data, and responding to whether there were budget rewards for data use. It is suggested that the Central Government agencies' experiences of making data open to the public, such as the setting up of OGD Advisory group, contents of use authorization policies (open data license), and introduction of public-private partnership, etc., should be provided for the references of the Six-Municipal and local government agencies.

The results of this study could serve as the reference for government agencies in Taiwan when developing open data policies, to see the insufficient aspects of existing management and implementation of open data. Some corresponding adjustments and changes should be made for enhancing policy making and implementation of open data. It is expected that the limited resources should be appropriately distributed, and government agencies should be encouraged and assisted more in participating and implementing in making data open. The current adopted model of the study uses a broader perspective to assess the maturity of open data implementation among government agencies. However, in terms of the

research results, the further understanding of certain aspects of the agencies could be still limited. It is suggested that qualitative research approach can be employed later to investigate the specific aspects of interests, and the current model can be further extended to include other aspects such as resources and budgets that are also crucial to sustain open data initiatives. The questionnaire items of the current study can also be enhanced for developing a more delicate assessment model. Lastly, while both open data providers and open data users play important roles in an sound open data ecosystem, future research should also focus on the related aspects of open data users for forming a more comprehensive assessment model.

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Research Article

Does the Learning of Computational Thinking Concepts Interact with the Practice of Digital Curation in Children? A Preliminary Case Study

Chun-Hao Chang

Abstract

Digital storytelling with block-based coding tools for children involved the exercise of both computational thinking (CT) and digital curation (DC). Relevant studies, however, were more concerned with the learning and development of CT concepts rather than the practice of DC. In this regard, the current study aimed to investigate the interrelationship between the learning of CT and DC through digital storytelling, particularly from the standpoint of elementary school children. A total of 35 fifth graders were recruited from a public school in New York City to voluntarily participate in a ten-week digital storytelling workshop where they curated an interactive story within the Scratch environment. Self-made scoring rubrics were implemented to evaluate students' digital storytelling projects from two measures: Computation Measure and Curation Measure. The overall analysis revealed no significant correlations between the two measures. Further investigations, however, on the interrelationship between each of the subcategories of the two measures indicated a number of significant correlations between the learning of CT concepts and the practice of DC. Relevant educational implications were intensively discussed to inform the design of teaching and curriculum.

Keywords: *Computational thinking, Digital curation, Digital storytelling, K-12 education*

Introduction

The cultivation of computational thinking (CT) skills at an early age is a topic that has gained universal awareness and acceptance in recent years. In a broad sense, CT skills can be perceived as general information literacy skills that have the potential to benefit young children's cognitive learning and thinking capabilities (Grover & Pea, 2013; Kafai, 2016; Voogt, Fisser, Good, Mishra, & Yadav, 2015). The study of CT produces practical knowledge of how to analyze and solve everyday problems by reflecting on how computer scientists would approach a problem in a systemic fashion. By acquiring this literacy skill, children

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learn not only problem-solving techniques but also fundamental principles of computation. The concepts of CT are abstract in nature, however, and are not easy for children to comprehend. One of the methods commonly adopted to assist children in making sense of abstract CT concepts is interactive, digital storytelling with block-based coding tools (BCTs). A BCT often incorporates a design that encourages children to practice CT concepts within a narrative context, such as an interactive story. A typical BCT, such as Scratch or Blockly, enables children to freely tinker with their ideas by an intuitive drag-and-drop process. In other words, children can delve directly into the learning of rudimentary CT concepts without memorizing complex syntax rules. Children can quickly create functional prototypes of their story ideas by snapping different colors of building blocks together, in a way that is consistent with their Lego building experiences. This process of virtual building block design and construction guides children to discover how each CT concept functions, both individually and together, to support the plot of an interactive story.

Though children were first thought to learn CT concepts by applying computational constructs to the design of digital stories with BCTs, it was later found that they seemed to be immersed in the process of creating story characters, selecting costumes, editing sound clips, or generating animation effects (Adams & Webster, 2012; Kafai, Peppler, & Chapman, 2009). For instance, with Scratch, its abundant multimedia resources, ranging from images, clip art, graphics, and audio clips, encouraged children to constantly use their imaginations to expand the scope of storytelling. Children could use multimedia elements to strengthen the narrative, organization, and interactivity of the story; this was often regarded as a motivating factor rather than a meaningful learning task in a CT classroom. From one standpoint, that of how well children were learning CT skills, this shift of the learning focus from CT concepts to a multimedia presentation could not only distract a student from concentrating on computational constructs but could lead the student to deviate from the original instructional goals. From another standpoint, however, that of library informatics, all of these caveats about learning could be given a new impetus and meaning: They could all be perceived as a form of digital curation (DC) practice, a process that generally involves digital content selection, information filtering, narration structuring, and public sharing (Albion, 2014; Fotopoulou & Couldry, 2015). In fact, when children acted as a multimedia storyteller in a BCT, they did not practice CT skills alone but DC skills as well. They learned how to program their story characters and how to select, filter, and arrange multimedia resources in relation to the plot of a story. Although BCTs were not originally designed for digital curation, they allow children to experience curating a multimedia exhibition of works that address their imaginations.

Following this, the exercise of a child's CT skills and DC skills could be intertwined in digital storytelling activities. This prompts the question of how children would handle these two skills, which are seemingly at variance, at the same time and how digital storytelling with BCTs can propel children to cultivate two sets of skills in one piece of work.

An overview of the literature on the effect of digital storytelling on children's cognitive development has shown that a substantial body of research has focused on the cultivation of CT skills, whereas the development of DC skills is rarely mentioned. Some studies revealed that digital storytelling with a BCT resulted in an effective understanding of abstract CT concepts by elementary school children (Burke & Kafai, 2010; Wilson, Hainey & Connolly, 2013). Others highlighted the effect of digital storytelling on children's critical thinking and creativity (Niemi, Harju, Vivitsou, Viitanen, Multisilta, & Kuokkanen, 2014; Psomos, & Kordaki, 2012) but included little about its effect on their DC skills. Although CT skills and DC skills seemed to vary in nature and scope, they were both essential skill sets for children to attain in order to formulate their mental representations of a problem. They both served as a framework for outlining and guiding a child's cognitive thinking activities. One might ask several questions about the two skill sets, such as what is the relationship between them? Could a student's CT skills become an indicator of his or her DC skills? Could a student's DC skills complement or conflict with his or her CT skills? Are there any possibilities to design and implement an interdisciplinary curriculum to cover both DC and CT skills through one learning task? All these questions await further clarification and elaboration to increase our knowledge about and enhance the discussion of this subject.

Literature Review

Digital Curation and Digital Storytelling

DC is an interdisciplinary concept incorporating aspects of content curation and digital resource presentation used primarily by the scientific and digital library communities respectively (Beagrie, 2006; Molloy, 2014). By definition, DC is basically a process through which a person collects, filters, organizes and presents a particular topic out of a larger collection with digital media, similar to how a museum curator or archaeologist brings together an exhibition from a particular frame of reference (Albion, 2014; Boon, 2011; Dale, 2014; Fotopoulou & Couldry, 2015; O'Neill, 2006). However, the application of DC is not limited to museums or art galleries. In other settings such as libraries, one of a librarian's core duties is to curate reference materials or online resources to support various needs of routine learning and teaching activities. Librarian must

be capable of collecting targeted information effectively through researching, filtering, categorizing and assessing its the relevance to the reader. In this regard, DC can be described one's mental representation of information, through which one imparts his or her own interpretation that is carefully designed and arranged to facilitate learning from the audience's perspective. In other words, DC can be described as a meaningful abstraction of information with aims to present the essence of a selected theme. To further illustrate the process of meaningful information abstraction, Deschaine and Sharma (2015) argued that DC should be implemented as a staged, sequential process that covers activities such as: (a) content collection, (b) content organization, (c) content critique, (d) content conceptualization and (e) content circulation. Though these activities are presented as a list, they do not necessarily occur in linear order, meaning a curator may switch from process to process until the final objectives are achieved. Hence, the curated content is narrative and provides a story as well as reflection of the curator's view of the world. This staged framework not only highlights the core components of DC but also sheds light on the similarity between DC and digital storytelling.

Storytelling is a natural way for human beings to recount experiences and create reasonable order out of experiences (Erickson, 1996; Gottschall, 2013; Moen, 2006). In essence, storytelling is a form of curation. The act of storytelling often begins with selecting a topic, structuring ideas, creating characters and organizing the story's plot, a process that is similar to curate an art exhibition. This procedure helps storytellers externalize their thoughts and imaginations through multimodal representations (Connelly & Clandinin, 1990; Isbell, Sobol, Lindauer, & Lowrance, 2004; Porter, 2004), and henceforth can serve as a pedagogical tool to foster children's thinking and self-reflections (Sadik, 2008). With the advancement of digital technologies, the notion of digital storytelling has emerged to enable new forms of creation. Digital storytelling can be described as ordinary storytelling with the enhancement of digital media or technology tools (Howell & Howell, 2003). Digital stories derive their power by weaving images, music, narrative and voice together, thereby giving deep dimension to characters, situations, experiences, and insights (Rule, 2010). In practice, the process of digital storytelling can be considered as an instance of DC from two standpoints. First, both digital storytelling and DC involve the creation of narratives through active, meaningful selection, organization and filtering of information based on personal perspectives (Mihailidis & Cohen, 2013). For both digital storytelling and DC, the final product is personal and unique, is representative of one's own creativity, and is carried out through a structured thinking framework. The ultimate goal is set to filter out irrelevant information in order to construct a

well-organized, self-contained curation project. Second, both digital storytelling and DC pivot heavily upon one's mental representations of the content to be demonstrated (MacDonald, 1998).

In terms of assessment, three approaches were found in the literature when examining a person's curation skills. Some conducted surveys questions (Creamer, Morales, Crespo, Kafel, & Martin, 2012); some designed self-made scoring rubrics (Cowick, 2018), still others implemented in-depth interviews (Molloy, 2014) to examine differences in students' DC skills. However, since one's curation work tends to be highly context-dependent, it becomes difficult to develop a standardized, unified assessment method that fits all purposes. In this study, we intend to implement scoring rubrics to examine students' in digital storytelling within the Scratch environment. Considering the multimedia features of a Scratch project, we particularly incorporated content interactivity and multimedia design as two new dimensions when assessing students' DC skills. These two dimensions reflect the nature of using digital technologies to curate a story. Therefore, aside from the dimensions of DC summarized in previous literature, following is the framework of DC skills proposed in this study:

- Content selection: the active selection and filtering of the content in order to generate the main theme of the digital story.
- Content organization: the organization and sequencing of the curation content with references to the plot of the digital story.
- Content originality: the originality as well as authenticity demonstrated in the curation content.
- Content interactivity: the level of interactivity and the design of interactive mechanism conveyed through the curation content.
- Multimedia design: the design and integration of various multimedia elements in the curation content.

Computational Thinking and Digital Storytelling

The cultivation of CT skills has listed as one of the core competencies for children to acquire, just like skills in mathematics and sciences. CT refers to a general analytical approach to problem-solving, designing systems and even understanding human behaviors (Barr & Stephenson, 2011, Guzdial, 2008; Wing, 2006; Wing, 2008). It is not a skillset merely for computer scientists to master; instead, it should be treated as a generic literacy skill shared by a wide spectrum of academic disciplines (Wing, 2008; Wolz, Stone, Pearson, Pulimood, & Switzer, 2011). CT related learning activities can be grouped into two categories — comprehension and generation. Comprehension focuses on one's capabilities to outline program structure for testing and tinkering; generation focuses on the ability to implement proper solutions with references to the comprehension

(Robins, Rountree, & Rountree, 2003). It was found a well-trained learner with CT skills should possess two type of knowledge: (a) Knowledge about the computational design plans, which are generic computer program fragments that represent stereotypic action sequences in programming. (b) Knowledge about carrying out the design plan with tools, which capture the conventions in computer programming and guide the composition of the design plans (Soloway, 1984).

Researchers were concerned about whether children could benefit from learning CT knowledge at a broader scope and, in the meantime, cultivate an integrative view on CT concepts (Kurland, Clement, Mawby, & Pea, 1986; Xinogalos, 2012). One of the essential tasks in CT is to generate symbolic abstractions of problems with respect to computational rules to represent a person's mental understanding and thinking. This process involves researching, filtering, categorizing and sense-making, which appears to be similar to the process of telling a story. Thus, engaging children in designing digital stories or animations has become a popular approach to practice basic, abstract CT concepts. In relevant studies, fundamental CT concepts includes the following categories (Brennan & Resnick, 2012):

- Sequence: to design a series of individual steps or sequential instructions for a particular activity.
- Event: to identify the causal relationship among things in a particular activity.
- Conditionals: to make decisions based on certain conditions or assign different outcomes with respect to different conditions
- Loops: to repeat a sequence of instructions until a certain condition is met.
- Variables: to store, retrieve and filter data as a virtual container for a particular activity.

Since the above CT concepts are abstract to children, interactive stories or animations are often used as a vehicle to demonstrate how each CT concept is associated with the plot of a story. For instance, the conditionals concept controls the flow of a digital story. Therefore, digital storytelling can be described as an instance of CT through which a person externalizes his or her understanding of abstract CT concepts. The narrative of a story and interactions among characters can be broke down into single or a combination of CT concepts. Through digital storytelling, students can more effectively recognize how to enhance the interactivity of a story through applying CT concepts. Papert (1980) argued that the development of CT concepts is analogous to building up a microworld to represent a person's conceptual understanding of computational knowledge. In other words, when a storyteller engages in the process of building up a digital

story with a tool such as Scratch, he or she is placed in a self-constructed microworld to testify how CT concepts should be applied to story narratives.

In sum, digital storytelling with BCTs is a learning task that encompasses the exercise of both CT and DC. In other words, when students engage in digital storytelling activities, they seek to achieve the same goals by applying two seemly different abilities at the same time. The learning of DC skills put emphasis on the selection, organization, originality, interactivity and multimedia design of digital content; the learning of CT concepts revolves around the planning, designing and implementation of different computational constructs such as sequence, event, conditionals, loops and variables. In contemplation of the relationship between CT and DC skills, we developed the following three research questions to guide the study.

1. How do students curate a digital story in terms of the five dimensions of DC (i.e., content selection, content organization, content originality, content interactivity and multimedia design)?
2. How do students design a digital story in terms of the five concepts of CT (i.e., event, sequence, conditionals, loops and variables)?
3. In digital storytelling activities, what is the interrelationship between the learning of CT concepts and the practice of DC?

Method

Participants

The study consisted of 35 students (16 males and 19 females) in the fifth grade between the ages of 10 and 11. All students were recruited from a public elementary school in the Washington Heights neighborhood of New York City. Participation in the study was completely voluntary and no incentives were offered for participation. Prior parental consent was obtained along with signed informed consent forms. Each student was asked to attend a 55 minutes storytelling workshop every week for ten consecutive sessions, during which they learned to create an interactive story within the Scratch application. None of the students had any prior computer programming experience or knowledge of the Scratch application.

Research Design and Procedure

The weekly Scratch design sessions were held as a storytelling workshop where students took the role as a storyteller to curate an interactive story based on their preferences. The same instructor was assigned for the workshop with assistances from two on-site teachers throughout the study. Each student was equipped with a labeled personal laptop as the design tool. There was no Internet connection in the classroom, meaning students were only allowed to import multimedia resources from the Scratch application to curate their interactive

stories. The storytelling workshop generally consisted of two parts: the first 30 minutes was reserved for guided instructions, followed by a 25 minutes hands-on Scratch design session. On day one, prior to the beginning of guided instruction, students were taught what constituted a story and what details appealed to the audience through in-class discussions.

The ten-week digital storytelling curriculum consisted of five different types of CT concepts based on Brennan and Resnick's (2012) categorization, including (a) event, (b) sequence, (c) conditionals, (d) variables and (e) loops. These concepts were taught one by one from simple computational construct such as event and sequence to sophisticated computational construct such as conditionals and variables. An overview of the curriculum design framework was illustrated in Figure 1.

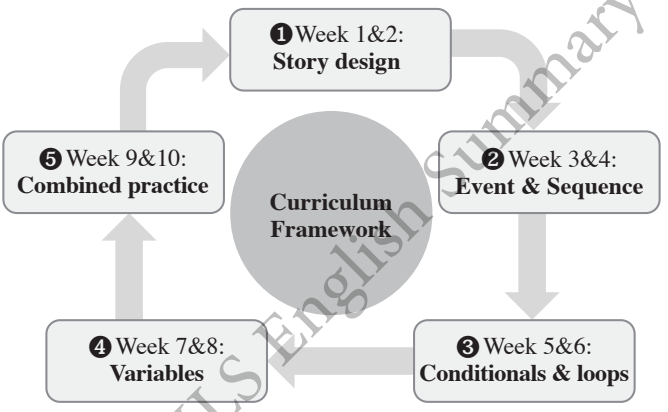

Figure 1 An Overview of the Curriculum Design Framework

Through guided instructions with worked examples, students learned to apply CT concepts one by one to build up their interactive stories through tinkering with Scratch building blocks. Two examples of students' curation project with Scratch were presented in Figure 2.

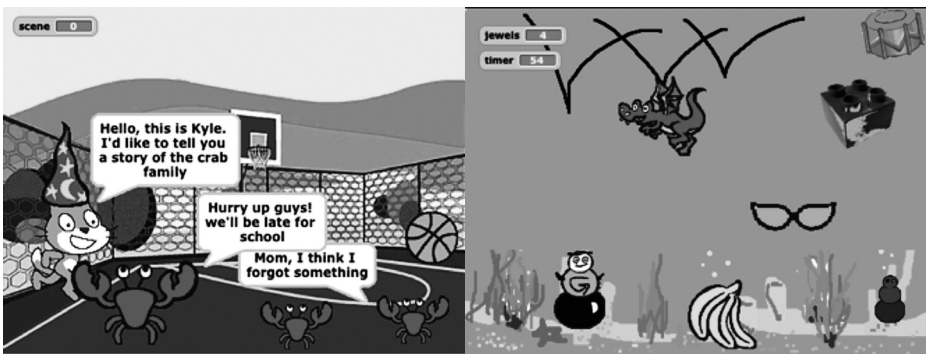

Figure 2 Examples of Student's Digital Curation Project with Scratch

The Scratch application was chosen as the digital storytelling tool for two reasons. From the perspective of CT, Scratch is a block-based, visual programming environment that enables students to quickly grasp CT concepts in an intuitive approach. From the perspective of DC, Scratch offers abundant, ready-made multimedia resources for students to curate a story. These resources include photo images, illustrations, clip art, sound tracks and animation effects. Scratch has been experimented as an effective digital storytelling tool for young children in previous studies (Bratitsis & Ziannas, 2015; Lye & Koh, 2018). Students can easily import these ready-made multimedia elements to their stories. In addition, the share button offered by Scratch allows students to quickly publish their projects with a wider audience in a timely manner. All these functionalities make Scratch an ideal tool for the exercise of both CT and DC skills at the same time.

Measures

There were two measures administered at the end of the workshop to investigate participants' DC and CT skills. The Curation Measure assessed the quality of participants stories from the standpoint of DC while the Computation Measure assessed participants understanding of CT concepts. A customized scoring rubric was created for each of the two measures. For the Curation Measure, the assessment was comprised of five dimensions, including: (a) content selection, (b) content organization, (c) content originality, (d) content interactivity and (e) multimedia design. For the Computation Measure, the assessment was designed in alignment with the curriculum structure, including (a) event, (b) sequence, (c) conditionals, (d) variables and (e) loops. When calculating the scores, three experienced Scratch instructors were invited as raters to assess students' Scratch curation projects. To understand inter rater agreement, the Kendall's W was calculated for the two measures. For the Curation Measure, the Kendall's W is .83; for the CT Measure, the Kendall's W is .94. These values indicated a good inter-rater agreement was achieved for both measures among the three raters.

Results

Analysis of Students' Scratch Curation Projects

Even though all students were instructed to design an interactive story, it was found their final curation projects were quite diversified. To better illustrate the DC project created by students, we attempted to categorize all Scratch curation projects as the following genres: (a) narration (60%), (b) art gallery (18%), video games (7%) and others (15%). In Table 1, we found narration (n = 21) was the most commonly seen genre created by students. Narration was

defined as a story with discernible structural patterns, cause-and-effect sequence of events and development of characters. Aside from narration, 18% of students' Scratch curation project was identified as an art gallery (n = 6), meaning they exhibited a collection of artwork based on a specific theme. A video game (n = 3) was another genre (7%) in which students designed a simple, interactive video game with predefined game rules to follow. Lastly, there were 15% of students' curation fell into the others (n = 5) category as these Scratch projects were simply a display of random pictures that didn't belong to any of the above categories. A breakdown of students' Scratch curation projects was demonstrated in Table 1.

Table 1 An Overview of Students' Scratch Curation Projects

Category	Percentage %	Descriptions
Narrative (n = 21)	60	A descriptive story with discernable details.
Art gallery (n = 6)	18	A collection of artwork based on a particular theme
Video game (n = 3)	7	A video game with predefined game rules to follow
Others (n = 5)	15	A visual display of random pictures

Analysis of the Curation Measure

The result of the Curation Measure was presented in Table 2. The mean score of students' overall Scratch curation skill was 2.71 out of 4, which fell between satisfactory and good according to the scoring rubric (see Appendix 1). Students achieved the highest mean score for the content selection dimension (M = 3.23, SD = 0.69) and the lowest score for the originality (M = 1.57, SD = 0.74) dimension. Overall, it was found students were rated as good (i.e., 3 points) for the content selection, organization and multimedia design dimension. The interactivity dimension was rated as satisfactory (i.e., 2 points) while the originality dimension was rated as poor (i.e., 1 points).

Table 2 Results of the Curation Measure

DC / Scores	Content selection	Content organization	Content originality	Content interactivity	Multimedia design	Total
Mean	3.23	3.11	1.57	2.65	3	2.71
(*SD*)	(0.69)	(0.63)	(0.74)	(1.05)	(0.81)	(0.99)

In the meantime, a one-way ANOVA test was conducted to examine any significant differences among the five dimensions of the Curation Measure. The analysis indicated a significant difference when comparing the mean scores between each dimension, $F(4, 170) = 24.97$, $p < .01$. Post hoc analysis using the Turkey HSD test further revealed that the originality dimension was significantly lower than the other four dimensions ($p < .05$). In addition, the content selection dimension was significantly higher than the interactivity dimension ($p < .05$). No other significant differences were obtained from the analysis. A visual comparison of mean scores among the five dimensions was presented in Figure 3.

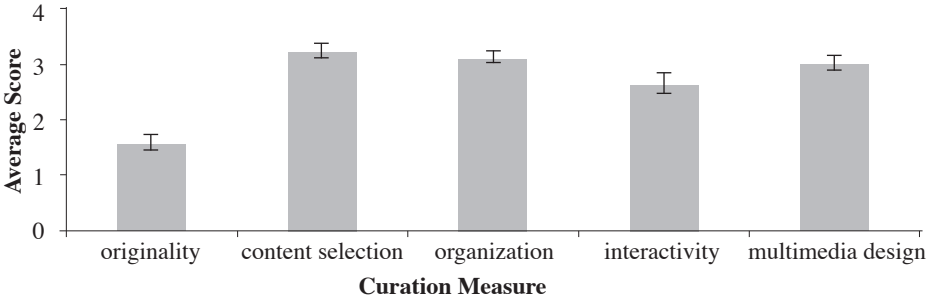

Figure 3 Differences in Mean Scores between Each of the Diemension of Curation Measure

Note: Error bars indicate the standard error of the mean.

Analysis of the Computation Measure

The result of the Computation Measure was presented in Table 3. The overall mean score for learning CT concepts was 2.81, which fell between satisfactory and good to the scoring rubric (see Appendix 2). Students achieved the highest mean score for the event concept ($M = 3.11$, $SD = 0.82$) and the lowest mean score for the variables concept ($M = 2.45$, $SD = 0.85$). Overall, students were rated as good (i.e., 3 points) for more simple concepts such as the sequence and event and satisfactory (i.e., 2 points) for more sophisticated concept such as the conditionals, variables and loops concept.

Table 3 Results of the Computation Measure

Scores \ CT concepts	Event	Sequence	Conditionals	Variables	Loops	Total
Mean	3.11	3.05	2.68	2.25	2.74	2.81
(*SD*)	(0.82)	(0.76)	(0.87)	(0.85)	(0.74)	(0.84)

When further examined the differences in mean scores among the five CT concepts, a one-way ANOVA test showed a significant difference in mean scores, $F(4, 170) = 3.94$, $p < .05$. Post hoc analysis using the Turkey HSD test further revealed that both the result of event and sequence concept significantly outperformed the result of variables concept ($p < .05$). No other significant differences were obtained from the analysis. A visual comparison of mean scores among the five CT concepts was presented in Figure 4.

Correlation Analysis between Curation Measure and Computation Measure

To examine the interrelationship between the Curation Measure and Computation Measure, a Pearson correlation analysis was performed. The analysis results indicated a non-significant correlation between the Curation Measure and Computation Measure, $r = .286$, $p = .095$. However, further investigations on correlations between each of the dimension within the Curation Measure and the Computation Measure indicated a significant positive correlation

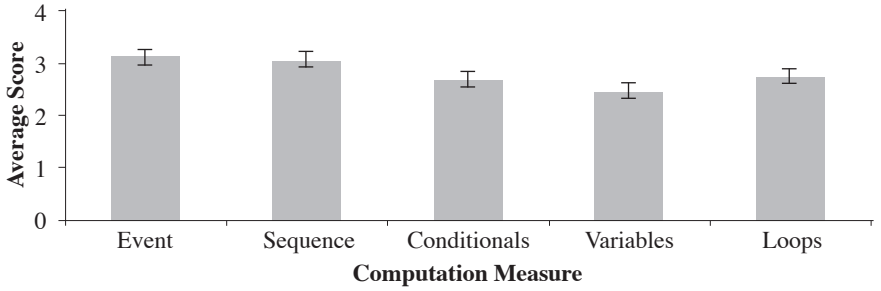

Figure 4 Differences in Mean Scores between Each of the Diemension of Computation Measure

Note: Error bars indicate the standard error of the mean.

under two conditions. In one condition, the analysis showed a significant positive correlation between the organization dimension of Curation Measure and the sequence concept of Computation Measure, $r = .535$, $p < .01$. In the other condition, the interactivity dimension of Curation Measure showed a significant positive correlation for the conditionals ($r = .779$, $p < .01$) and loops ($r = .598$, $p < .01$) concept. No other significant correlations were obtained from the analysis. Detailed results of correlation analysis between the Curation Measure and Computation Measure were presented in Table 4.

Table 4 Correlation Analysis between Curation Measure and Computation Measure

Computation measure \ Curation measure	Content selection	Content organization	Content originality	Content interactivity	Multimedia design
Sequence	$r = .316$ $p = .065$	$r = .535$ $p < .01$	$r = .032$ $p = .854$	$r = -.053$ $p = .763$	$r = -.104$ $p = .554$
Event	$r = .261$ $p = .130$	$r = .030$ $p = .862$	$r = -.061$ $p = .726$	$r = -.088$ $p = .615$	$r = -.132$ $p = .450$
Conditionals	$r = -.319$ $p = .062$	$r = -.309$ $p = .071$	$r = -.262$ $p = .128$	$r = .779$ $p < .01$	$r = .169$ $p = .333$
Variables	$r = .076$ $p = .701$	$r = .064$ $p = .715$	$r = -.287$ $p = .095$	$r = .376$ $p = .060$	$r = .129$ $p = .461$
Loops	$r = -.227$ $p = .190$	$r = -.124$ $p = .478$	$r = -.207$ $p = .233$	$r = .598$ $p < .01$	$r = -.049$ $p = .778$

Discussion

One might reasonably wonder why to investigate the interrelationship between the learning of CT and DC skills for children. Of course such skepticism was not completely unwarranted as the two skillsets appeared to vary by nature. In fact, this study was a reflection of previous research framework about teaching children CT practices with Scratch, in which researchers pointed out that children seemed more engaged in curating the multimedia content than in practicing the CT concepts during digital storytelling activities (Kafai et al., 2009). In other

words, when guiding children to design an interactive story with Scratch, there were possibilities that the learning of CT and the learning of DC could interfere with each other, which in turn caused difficulties not only in instructional design but also in the attributions of educational outcomes. Our findings, in contrast, suggested that the learning of CT was not mutually exclusive to the learning of DC for children. Instead, the two skillsets could compliment each other in a number of aspects, such as the organization of the story's plot helped student practice the sequence concept of CT; the curation of interactive elements of the story helped students articulate how to appropriately apply conditionals and loops constructs to the design of the story. The following paragraphs first explored the results and implications of Curation Measure and Computation Measure, followed by intensive discussions on the interrelationship between CT and DC skills.

Implications for Digital Curation Skills

The analysis of the digital curation (DC) project demonstrated that nearly 85% of the students completed a well-defined curation project using Scratch. Only 15% of students' Scratch projects lacked a theme that would connect personal experiences. In most students' projects, a cohesive sense of purpose was demonstrated. The percentage of completions was higher than expected because this workshop met only once a week for 10 sessions. When we investigated the types of curation projects, most were identified as narratives (60%) that had an articulated beginning, middle, and end for the reader to follow. Projects with an art gallery (18%) were the second most popular type; in them, students showcased their personal artwork. We found students were highly motivated to use the free drawing tools offered by Scratch to create their own clip art or audio recordings to convey their thoughts and ideas. A small number of students' curation works had a video game (7%), in which story ideas were transformed into either a contest or a puzzle with clearly defined game rules. Curation works that seemed to drift in many directions without a theme were categorized as other (15%).

Interestingly, though the same instructions and guidelines were given to all students, their curation projects varied greatly. Different children might have different perceptions about what constitutes a story. The variation in genres of curation also reflected the multimedia affordability and interactive elements offered by Scratch, which was consistent with findings in relevant studies (Kafai et al., 2009). Some students stayed focused on the narrative aspect of a story, others switched to the visual, aesthetic aspects of a story, and still others created entertaining elements for a story. To better illustrate how students curated an interactive story with Scratch, we summarized the core learning activities as a three-phase framework by referencing to the model proposed by Deschaine and Sharma (2015). First, DC began with active selection and filtering of

multimedia resources in Scratch, a process through which a student learned to collect and filter out irrelevant data using cognitive learning procedures, such as critical thinking, problem solving, and self-reflection (Harvey, 2010). Next, students delved into the organization, arrangement, and evaluation of multimedia resources. This required a student to form a solid mental representation of the content to be curated by meticulously aligning the audience's expectations with his or her conceptual design plans. In the final phase, students demonstrated the content to be curated by coordinating multimodal representations, such as texts, images, audio clips, and animations (Porter, 2004).

Exploration of the mean scores of the five dimensions of Curation Measure (i.e., originality, content selection, story organization, interactivity, and media effect) suggested that digital storytelling with Scratch contributed to the understanding of children's DC skills in general. Digital storytelling served as an effective vehicle that helped students construct their knowledge through the learning by doing immersion method of constructivism (Yang & Wu, 2012). Students demonstrated better curation skills in the dimensions of content selection and story organization than in other dimensions. These two skills were considered fundamental to DC, particularly with the use of digital technologies (Hobbs, 2011; Mihailidis & Cohen, 2013). Besides, post-hoc analysis showing a significant difference between the content selection dimension and the interactivity dimension implied that it was more difficult to curate the interactivity of a story with block-based coding tools (BCTs). The interactivity dimension should be perceived as an interdisciplinary skill because it might involve knowledge in other domains, such as computer science. Meanwhile, students' performance in the multimedia design dimension revealed that they endeavored to integrate various media elements into the content in order to enhance the sensational experiences for the audience. It is worth noting that students had the lowest mean score for the originality dimension. Apparently, this was due to the influence of the entertainment media to which children are exposed every day; a huge portion of students' curation projects were reproductions of cartoons, movies, comic books, or video games that they often encounter. This caused us to try to further understand the potential effect of the entertainment media on children's DC skills in the future.

Implications for Learning Computational Thinking Concepts

Students' learning of computational thinking (CT) concepts during storytelling activities was examined through the framework of the five CT concepts (i.e., sequence, event, conditionals, loops, and variables). Using the overall mean score ($M = 2.81$) as a cut-off value, we found that their performance in the event and sequence concepts was above the overall mean score, whereas their performance in concepts such as conditionals, variables, and loops was below

the overall mean score. This implied that students demonstrated an understanding of CT concepts more on the comprehension aspect than on the generation aspect (Robins et al., 2003). These findings were consistent with relevant studies in which children struggled with understanding more advanced CT concepts, such as conditional statement and recursion (Fessakis, Gouli, & Mavroudi, 2013), because they tended to be abstract and lacked concrete representations from which students could develop a good mental model of computational constructs when breaking down a problem into an action plan (Pea & Kurland, 1984; Shneiderman, 1980). The event and sequence concepts were easier to comprehend because they were simple in computational structure and complexity. Students were able to trace and monitor the consequences of their actions in relation to the story narratives. In sum, understanding abstract CT concepts depended not only on one's mental representation but also on the ability to break a problem down into manageable chunks with reference to the story's plot.

Because the learning of CT concepts revolved around digital storytelling activities, we further analyzed the five CT concepts related to functionality in storytelling. The sequence and event concepts served as the foundation of the story in which the student assigned the character's position on the stage and set up navigation buttons. In addition, the student had to coordinate the timing of conversations or scene transitions, actions that were not easy for novices to achieve. The conditionals and loops concepts were responsible for the cause-and-effect relationships in the story narratives. These two concepts outlined the logical path of the story's plot and controlled the conceptual flow of the story. Because conditionals and loops are abstract constructs that might cause misconceptions in learning (Kaczmarczyk, Petrick, East, & Herman, 2010), we found students struggled with the inclusion of these judgment statements into their story narratives. It was notable that most students knew where and when to place a conditional construct but they failed to correctly drag and arrange the appropriate building blocks that would enable the conditional construct. The variable concept functioned as either a sensor or a data container that allowed the storyteller to interact with the audience. As a sensor, the audience could input data with a keyboard to actively participate in or respond to the story narrative. As a data container, the storyteller could collect contextual data to provide customized feedback when needed.

The Interrelationship between CT and DC

The Pearson correlation analysis showed that the learning of CT concepts and the practice of DC appeared to develop independently of each other. There was no empirical evidence to support such a finding, because no previous studies had ever explored the interrelationships between the two abilities. Further

investigation of the interrelationship between each of the dimensions within the two skills, however, guided us to uncover a possible conceptual linkage between the two seemingly different knowledge domains. For instance, a significant, positive correlation was reported between the organization dimension of the DC skill and the sequence concept of CT. This could be explained by the similarity between the two concepts because both of the evaluation criteria concentrated on the structural progression of a story. The organization dimension of DC evaluated students' abilities to organize the progression of a story plot. Likewise, the sequence concepts of CT examined students' ability to use the computational construct to support the ordering of events in a story. If a story had a well-organized structure during the process of DC, it would become easier for the storyteller to articulate the design of the computational constructs. To put it differently, the organization dimension represented the ability to conceptually organize a story, whereas the sequence concept represented the pragmatic skills needed to carry out the conceptual design plans. In this regard, a student's performance of CT skills could be explained by the student's performance of DC skills. A similar rationale was seen in the interactivity dimension of DC, where a significant, positive relationship was identified with the conditionals and loops concepts of CT. Given the fact that the design of both the conditionals and loops constructs controlled and determined the interactive mechanism of a story, it was reasonable that they would be significantly correlated with each other.

Henceforth, we argued that the learning of CT concepts and the practice of DC were in fact closely related to each other when engaging children in digital storytelling with a BCT such as Scratch. DC through digital storytelling could facilitate the learning of CT concepts under certain conditions. Additionally, the learning of CT and DC concepts could be perceived as a process of mental model construction through learning by doing. One's curation work could be perceived as a mental representation of a particular topic (Wolff & Mulholland, 2013) while one's understanding of a CT concept could be perceived as a mental representation of an abstract computational construct. These findings also shed light on instructional design practices in the sense that the learning and teaching of CT and DC skills should be regarded as one interdisciplinary skill that can be acquired by children. A common criticism of teaching novices computational constructs such as conditionals and variables is the lack of a rich, contextualized description of CT concepts (Gries, 2006; Gomes & Mendes, 2007; Veerasamy, D'Souza, & Laakso, 2016). The practice of DC, however, overcomes this drawback by situating students in a learning context where they can reflect on their personal experiences. Thus, the learning and teaching of abstract CT concepts, regardless of their functionality and complexity, should be framed in DC activities such as

storytelling to more effectively motivate a student. In other words, the ideas of DC could serve as a road map that can guide the learning of CT concepts.

Conclusion

This study aimed to understand the interrelationship between children's learning of CT concepts and the practice of DC because the learning of computational constructs seemed to overlap with the notion of curating a story. From analysis of the Curation Measure, we found students were most engaged in the content selection and story organization activities. Significant differences in mean scores between the five dimensions guided us to recognize students' insufficient knowledge when curating a story with Scratch. From analysis of the Computation Measure, students' learning performances were consistent with the level of difficulty of each CT concept. Though no significant difference was found in mean scores for each of the five CT concepts, students tended to struggle with integrating the more abstract, complex CT concepts (i.e., conditionals, loops, and variables) into digital storytelling activities. Further investigations revealed a significant, positive correlation between the content organization dimension and the design of sequence concept in CT. In addition, the content interactivity dimension was significantly correlated with the design of conditionals and loops constructs of CT. These findings led to an interdisciplinary collective perspective on the assessment of a student's learning of CT and DC practices. It was hoped that the learning of CT concepts would manifest itself in context of DC while the practice of DC would be strengthened by the inclusion of computational constructs.

There were a number of limitations in this study, and, based on these, further research suggestions were proposed as follows. One limitation of this study was the selection of CT concepts as we only focused on the five fundamental concepts. Further studies might expand the research scope by including more complex computational constructs to curate an interactive story. Next, since there were no Internet connections throughout the workshop, we didn't explore the content circulation aspect of DC skills. Further studies might attempt to investigate how students publish their Scratch curation projects online and reflect on the collected feedback to enhance their DC skills. A third limitation was the time and scheduling constraints. The study took place only once a week for 10 sessions whereas more frequent learning experiences and a longer duration of activities could result in finding more profound interrelationships between CT and DC. Lastly, though the same instructions were given to all students, we did not explicitly restrict the genre of the curation project to be a narrative story or not. Variations among different genres of DC might lead to different conclusions when

interpreting the data. Future studies might seek to narrow down the scope by peeking into the interplay between CT and DC skills based on a particular genre of curation project.

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Appendix 1

Curation Measure Scoring Rubric

Points / Category	0 (Unacceptable)	1 (Poor)	2 (Satisfactory)	3 (Good)	4 (Excellent)
Content Selection	No specific theme of curation was defined.	A theme could be roughly identified and the content lacked coherence.	A theme was clearly identified but not well-maintained.	A theme was clearly identified and mostly maintained a focus.	A theme was clearly identified with a coherent focus throughout the curation.
Content Organization	A beginning, middle or end of the story was missing. No important plot elements.	Part of a beginning, middle or end of the story was created. No important plot elements.	A clear beginning, middle and end were created. No important plot elements.	A clear beginning, middle and end were created with some important plot elements.	A clear beginning, middle and end were created with all plot elements in detail.
Content Originality	The content was not original at all.	The content was partially original with minimal modifications.	The content was partially original with major modifications.	The content was original and uniquely presented.	The content was original and exceptionally unique.
Content Interactivity	No interactive story narrations were added.	Attempted to add interactive story narrations but didn't match the story's plot.	Interactive story narrations were created to match some parts of the story's plot.	Interactive story narrations were created to match most parts of the story's plot.	Interactive story narrations were properly created for the entire story's plot.
Multimedia Design	No multimedia element (i.e., visual effects, animations or sound clips) was seen.	Added multimedia elements but the design of effect was not understandable.	Multimedia elements were adequately added to enrich some parts of the story.	Multimedia elements were correctly added to enrich most parts of the story.	A well-planned selection of multimedia element was made to enrich the whole story.

Appendix 2

Computation Measure Scoring Rubric

Concepts \ Points	0 (Unacceptable)	1 (Poor)	2 (Satisfactory)	3 (Good)	4 (Excellent)
Event	No event blocks were found on the stage.	Dragged event blocks but attached nothing to them.	Added event blocks but were attached to the incorrect characters.	Correctly added event blocks to characters but had redundant blocks.	Correctly added event blocks without any errors.
Sequence	No sequence blocks were found on the stage.	Dragged sequence blocks but attached nothing to them.	More than 3 programming errors were found for the sequence blocks.	Only 1-3 programming errors were found for the sequence blocks.	Correctly added sequence blocks without any errors.
Conditionals	No conditionals blocks were found on the stage.	Dragged conditionals constructs but attached nothing to them.	More than 3 programming errors were found within the conditional constructs.	Only 1-3 programming errors were found within the conditional constructs.	The conditionals constructs were correctly created without any errors.
Variables	No variables blocks were found on the stage.	Created variables blocks but attached nothing to them.	More than 3 programming errors were found within the variables construct.	Only 1-3 programming errors were found within the variables construct.	The variables construct was created correctly without any programming errors.
Loops	No loops blocks were found on the stage.	Dragged loops blocks but attached nothing to them.	More than 3 programming errors were found within the loops construct.	Only 1-3 programming errors were found within the loops construct.	The loops construct was created correctly without any errors.

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Research Article

An Application of ePUB3 eBooks to the Design and Teaching of Flipped 'Applied Writing' Courses: An Example of 'Abstract Writing'

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Abstract

In this paper, we explore the application of a newly introduced ePUB3 eBook technique on the flipped learning of writing courses and hence present a flipped lesson design process that specifies the lesson plan and curricular contents with ePUB3 functions used in learning activities for delivering desired contents. For illustration, the process is practically applied on the "Abstract Writing" unit of a Chinese "Application Writing" course in a local university. For assessment, a quasi-experimental study on the control analysis of experimental and control groups and its accompanied questionnaires and interviews is conduced to verify the effectiveness and students' favors of applying flipped learning and ePUB3 eBooks on the academic Chinese "Application Writing" courses. The research results show that the proposed design process for writing courses, through the application of flipped learning and ePUB3 eBooks, can improve the effectiveness of students' learning in abstract writing. Further, students also advocate using this approach in their learning.

Keywords: *Writing teaching, Flipped learning, Lesson design, ePUB3 eBook, Quasi-experimental study, Teaching assessment*

SUMMARY

In recent years, research about the management and related information systems of e-Learning have been widely conducted. Colleges started to deploy e-Learning platforms such as Moodle and iLearn to enable students to study course contents on these platforms for their learning. In addition, various auxiliary e-Learning channels such as MOOC have also become popular and they have extended the ways and methods of learning. From a learning perspective, this means that the curricular contents are delivered to students in an appropriate manner based on the sequence of learning activities in order to achieve the expected learning outcomes.

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Further, to respond to the developing trend of education, colleges have started to adjust teaching methods into a blended manner. The focus of such a blended learning is to impose e-Learning on their education systems. That is, utilizing both of the Internet technologies and the face-to-face interactions with teachers and students to improve the effects of teaching and learning. As one may recognize, such an achievement is due to the increased participation of students in a classroom that improves their learning experience. At present, among the possible modes of blended learning, flipped learning is one of the most commonly used approach that emphasizes a student-centered learning environment. It enhances students' interest in learning and also improves their abilities on independent learning through studying of curricular content and participating in class activities.

In this paper, we explore the application of a newly introduced ePUB3 eBook technique on the flipped learning of Chinese 'Applied Writing' courses. As such, teachers can take the advantages of ePUB3 eBooks to deliver the curricular contents in a variety of ways to students through appropriate flipped learning activities. Also, since our study focuses on the use of ePUB3 eBooks in the flipped learning, the discussion addresses the following three points: (a) the learning activities in the ePUB3 eBook-based flipped learning of Chinese 'Applied Writing' courses, (b) the design and construction of the content of the ePUB3 eBooks used in the flipped learning of Chinese 'Applied Writing' courses, and (c) the ways that ePUB3 functions are embedded into the ePUB3 eBooks for assisting the delivery of curricular contents and the completion of flipped learning activities.

Therefore, to achieve the purpose of our study, we explore and present a flipped lesson design process that specifies a lesson plan and curricular contents with ePUB3 functions used in learning activities for delivering desired contents. Based on the research of existing flipped learning approaches, we follow a process that takes many considerations at the flipped learning of Chinese 'Applied Writing' courses including the curricular contents of ePUB3 eBooks and the functions embedded in ePUB3 eBooks. The process includes the following five steps:

1. Identify each unit's objectives of a Chinese 'Applied Writing' course

This step focuses on the identification of each unit's objectives of an academic Chinese 'Applied Writing' course. For instance, the 'Abstract Writing' course unit discussed in our study has the following objectives: (a) to find out the main subjects of an article, excerpt its key sentences and paragraphs, (b) to reorganize an article to express its contents with concise sentences, and (c) to have the abilities of reading an article in an efficient manner.

2. Specify each unit's learning activities of the Chinese 'Applied Writing' course

This step focuses on the specification of each unit's learning activities of the writing course. For instance, the learning activities of the 'Abstract Writing' unit discussed in our study are: (a) before a class, students preview the curricular contents of the ePUB3 eBooks used in the class, (b) at the beginning of the class, students take a pre-class test for capturing the effects of their preview, (c) in the class, teachers deliver a supplemental lecture based on the results of pre-class tests to enhance the essential knowledge about writing and to assist students participate in later group discussions, (d) in the class, with sufficient essential knowledge about writing, students participate in the group discussions on writing topics to deepen their writing thinking and training, and (e) at the end of the class, students take a post-class test for evaluating their learning in the class.

3. Design the contents of the ePUB3 eBooks used in each unit of the writing course

This step focuses on the content design of the ePUB3 eBooks used in each unit of the writing course. This is achieved by considering what the curricular contents are and how they are designed to take advantage of ePUB3 eBooks to be delivered to students in a variety of ways with the flipped learning activities in the unit. For the 'Abstract Writing' unit, the contents of its ePUB3 eBooks can be designed in a systematic way. Initially, considering the objectives of abstract writing, the basic concepts and application knowledge of writing an abstract can be added into the contents. Then, for the students pre-class preview, these contents can be organized in a layered manner for assisting their preview to gradually deepen their knowledge about abstract writing. In addition, for students' group discussions on writing topics, an outline of thinking and sharing can be added to guide their discussions for constructing their own knowledge about abstract writing.

After designing the contents of the ePUB3 eBooks, it is then required to embed adequate ePUB3 functions in these eBooks. As the ePUB3 technology supports plenty of rich functions embedded in its compliant eBooks such as various templets, multiple media, interactive communications, and dynamic displays, the focus is therefore on how to employ the suitable functions into ePUB3 eBooks for assisting the delivery of designed contents under the flipped learning activities. In general, the most common functions used in ePUB3 eBooks can be picture, video, referential link, guided reading, automatic repetition, individual exercise, group discussion, and quiz and test.

4. Construct the ePUB3 eBooks used in each unit of the writing course

With the design of the contents and embedded functions of the ePUB3

eBooks, this step focuses on the construction of these eBooks. In general, this can be achieved by adding the designed contents and embedded functions into eBooks using applicable tools such as ViewPorter, InDesign, Sigil, and Calibre. Based on their features and the quality of constructed artifacts, ViewPorter is adopted herein to construct the ePUB3 eBooks.

5. Instruct and assess each unit's class of the writing course

After constructing the ePUB3 eBooks, the writing course can be instructed in accordance with the scheduled classes of its units. In this step, each unit's class is instructed under the above specified learning activities with the respective ePUB3 eBooks used for students' preview, pre-class test, in-class lecture, group discussion, and post-class test. For the assessment of the instructed class, two ways are conducted:

(1) A quasi-experimental study on the control analysis of experimental and control groups is conducted to verify students' learning effectiveness of applying our ePUB3 eBook- based flipped learning approach on the teaching of the class.

(2) A questionnaire and interviews are conducted to verify students' preferences about applying our ePUB3 eBook-based flipped learning approach.

The process above was practically applied in the Fall semester of 2017 on the 'Abstract Writing' unit of a Chinese 'Applied Writing' course at a local university. For assessment, a quasi-experimental study on the control analysis of experimental and control groups was conducted where (a) these two groups had 43 and 47 students respectively, (b) they had similar enrollment ages, scores, and backgrounds, and (c) they all had no learning experiences on flipped learning and ePUB3 eBooks. The results show that our proposed design process for writing courses, through the application of flipped learning and ePUB3 eBooks, can improve the effectiveness of students' learning in abstract writing. Further, after conducting the questionnaire and interviews, the results also show that students advocate using this approach in their learning.

Finally, it should be noted that although there are already many flipped learning approaches, they employ commonly videos as the learning media. Videos lack interactive and dynamic mechanisms, students get less involved in reading and hence have less interest in their learning. In contrast, our study uses ePUB3 eBooks as the learning media that employ the rich functions of the ePUB3 technology to alleviate such restrictions. It not only provides students with a more attractive learning and communicative environment, but also provides teachers with an efficient teaching and supportive environment.

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Research Article

Quality Discussion and High-Level Comprehension: An Analysis of Taiwanese College Students

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Abstract

Reading has been a focus of research attention because it is one of the important skills to achieve academic success and become life-long readers. Most research in reading puts focus more on how readers can comprehend information from reading; however, only a few studies have focused on how reading can facilitate readers' critical thinking. One teaching approach, Quality Talk (QT), has been found to enhance students' literal comprehension and critical thinking, but these studies have been conducted in classes where English was students' first language. Therefore, the present study aimed to examine the effects of QT on Taiwanese students' reading comprehension in English and the development of critical thinking. Two classes were randomly assigned as a control and an experimental group respectively. While the students in the control group received regular English class, the students in the experimental group received a training session including how to ask questions and how to conduct group discussions. The students' reading comprehension was evaluated through multiple choices and open-ended questions; and their development of critical thinking was evaluated through group discussions which were recorded, transcribed, and analyzed. The results have shown that scores of the reading comprehension test in the experimental group were significantly higher, which suggested that the training session made the students more involved in the text and they thus had better understanding on the text. The experimental group students further used significantly more authentic questions, which suggested that the students were able to relate their personal experience and information of outside world to the text.

Keywords: *Text-based discussion, Discourse analysis, Group discussion, Reading comprehension, Critical thinking*

Introduction

Being able to comprehend and analyze the reading texts are critical requirements for students to achieve academic success and important skills for

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life-long readers (National Academy for Educational Research, 2015; National Assessment Governing Board, 2013). Because reading is a dynamic process that involves a range of complex cognitive and meaning making processes (e.g., Goffman, 1959; Nystrand, Wu, Gamoran, Zeiser, & Long, 2003), researchers have strived to construct what reading is and how reading relates to performance in order to plan on reading processes and to evaluate reading achievements. National Assessment Governing Board (2013) substantiate readers' cognitive abilities in reading from basic to advanced levels: to "locate and recall", "integrate and interpret", and finally "critique and evaluate". The advanced level of reading comprehension refers to the ability to "integrate, interpret, critique, and evaluate" in the present study.

In order to help students to achieve advanced level of reading performance, many teaching interventions in reading are proposed; group discussion is one of the effective approaches (Higham, Brindley, & Van De Pol, 2014; Nystrand et al., 2003). The following describes two theoretical frameworks that explain why learning is achieved in group discussion and why discussions can facilitate students' high-level comprehension. First, learning is taken place through participating in social activities (Rogoff, Matusov, & White, 1996; Vygotsky, 1962). The learning in group discussions can be realized through the "guided participation", which means that more competent individuals, students or teachers, provide assistance for less competent individuals to comprehend content knowledge and also learn to solve problems (Rogoff, 1990; Rogoff et al., 1996). Tharp and Gallimore (1988) provided a successful documentation of how guided participation can be achieved in Kamehameha Elementary Education Program (KEEP) project in which teachers gave guidance by asking authentic questions, modeling and giving feedbacks for low achievers during group discussions.

The other theoretical framework, Dialogism suggested by Mercer (1998, 2000, 2002) and Heath (1983), explains why dialogic discourses can benefit high-level comprehension. They propose that language is a tool for interlocutors to think collectively. When individuals engage in discussions, the context of the discussions become a "shared framework of understanding" (Mercer, 1998, p. 5). In order to achieve mutual understanding in the context, individuals/learners must understand interlocutors' meanings and then be able to respond by offering their own ideas, that is, using language as a vehicle to "co-reasoning". In this process of "co-reasoning", Mercer (1998) further suggests that the students can thus enhance cognitive ability and critical thinking skills. In contrast, monologic discourse involves exchange of the "truth" or "known" in which students have little chance to contributes their ideas or participate actively in the construction of knowledge (Bakhtin, 2010).

Based on the above studies, the group discussion seems to be a potential approach for learning. Therefore, recently there was an increased attention to the group discussions as teaching interventions on reading. Despite the fact that the group discussions seem to be theoretically effective, not all discussion approaches are equally effective in enhancing students' literal and high-level comprehension. This can be observed in Murphy, Wilkinson, Soter, Hennessey, and Alexander (2009). They conducted a meta-analysis aiming to examine the effects of text-based discussion approaches on both literal and high-level comprehension. In their review of 42 quality journal papers, most of the discussion approaches[1] were effective in enhancing students' literal comprehension; however, only a few studies focused on enhancing students' high-level comprehension, such as *Junior Great Books*, *Collaborative Reasoning*, and *Philosophy for Children* (adopted from Murphy et al., 2009).

In particular, *Book Club* was effective especially in enhancing students' metacognitive ability in a pre- and post-test experiment design. Murphy et al. (2009) concluded that while different discussion approaches were designed for different learning goals,[2] only a few text-based discussion studies aimed to enhance both literal and high-level comprehension. Therefore, Murphy and colleagues identified the benefits of the text-based discussion approaches and proposed Quality Talk (QT), which aimed to enhance both literal and high-level comprehension (Murphy, Firetto, Greene, & Butler, 2017). In particular, students' use of questions and feedback in group discussion was taken as discourse indicators of high-level comprehension because it was found that asking questions and having elaborated explanation (EE) and exploratory talk (ET) indicated students' critical thinking and reasoning in discussions (Soter, Wilkinson, Murphy, Rudge, Reninger, and Edwards, 2008). QT has been implemented in some studies and they were reviewed below.

[1] The reviewed discussion approaches are *Instructional Conversations, Junior Great Books, Questioning the Author, Collaborative Reasoning, Paideia Seminars, Philosophy for Children, Book Club, Grand Conversations,* and *Literature Circles*.

[2] The goals of learning are divided into three types: Expressive, Efferent, and Critical analytical stance. The expressive stance indicates that students' discussions are more affective oriented. This approach requires more of participants' personal opinions, which includes *Book Club, Literature Circles,* and *Grand Conversations*. The efferent stance means the purpose of the discussion is to acquire information. This approach requires students to remember the factual information, which includes *Instructional Conversations, Junior Great Books,* and *Questioning the Author*. The critical analytical stance gives prominence to asking questions and understanding the underlying information of the text, which includes *Collaborative Reasoning, Paideia Seminar,* and *Philosophy for Children*.

Literature Review

The Discussion Approach: Quality Talk (QT)

Reninger (2007) examined the effect of Quality Talk (QT) on eight low-achievers' (four and fifth grade) reading and high-level comprehension. Because the researcher adopted a qualitative view, the data included the researcher's observation notes, transcriptions of student interviews, transcriptions of group discussions, and the students' writings. The students' reading comprehension was evaluated through their writing, while their high-level comprehension was evaluated through their group discussions. The data analysis revealed that the students' reading and high-level comprehension scores have improved. The students were able to give factual information extracted from the text in their writing and to use examples and reasons to support their claims (i.e., EE) in their discussions.

Davies and Meissel (2015) also adopted Quality Talk and investigated the effects of which on students' high-level comprehension in a New Zealand secondary school. In their study, they observed their students' performance in a control (i.e., regular group discussion) and an experimental (i.e., with Quality Talk) group on three time spots (before, during, and after intervention). All of the discussions were audio recorded. Through analyzing the students' group discussion recordings, the results have shown that the students of both groups interacted in a turn taking style at time one; however, when the students were more familiar with each other and the QT discussion approach, they were more engaged in the interaction at time three. In terms of students' quality of discussions, the students had more cumulative talk (CT, contributing one's ideas to a dialogue without challenging each other), and fewer ET at time three. Davies and Meissel (2015) explained that the students made gains in high-level comprehension, but not yet ready for challenges and disputes.

Li et al. (2016) compared the effects of three types of teaching interventions on fourth and fifth grade students' reading and high-level comprehension: TWA, QT, and Hybrid. TWA suggested a before, during, and after reading strategies teaching approach. Before reading strategies helped students foster their background information; during reading strategies helped students monitor their reading processes and made connections between texts and their background information; after reading strategies required students to identify a main idea of texts. QT intervention included teachers' teaching on how to ask questions and to make responses and teachers' scaffolding based on a set of pedagogical principles, such as promoting dialogic inquiries and productive discussions. Finally, the hybrid suggested a combination of both TWA and QT interventions. The students' reading comprehension and group discussion recordings were examined. It was

found that the students of the experimental groups (TWA, QT, and Hybrid) have improved their literacy understanding based on a multiple choice questions test; however, only the students in the QT group showed high-level comprehension by using significantly more authentic questions, EE, and ET. This suggested that the students have improved both literal and high-level comprehension through QT teaching intervention.

Discussion Approaches Used in Taiwan

Although QT has yet implemented in Taiwan, other text-based discussion approaches have been implemented. For example, Shen (2013) investigated three text-based discussion approaches (*Book Club,* BC; *Literature Circles,* LC; *Instructional Conversations,* IC) and compared their effects on students' literal and high-level comprehension. Four classes were assigned as basal, BC, LC, and IC group and were taught by four different instructors. All of the students underwent three major phases over a five weeks experiment: pre-test (comprehension tests and essays; in the first week), teaching interventions (not for basal group; for three weeks), and post-test (comprehension tests and essays; in the last week). There was no difference in the students' literal comprehension among four groups of students, but the students from BC, LC, and IC group outperformed the students in basal group in two tests (interpretive comprehension test and theme-related essays). Although these text-based discussion approaches did not aim for critical analytical stance (BC and LC for expressive stance; IC for efferent stance), text-based discussion approaches can benefit their students' high-level comprehension to some extent.

Based on the above discussion, it seemed that QT discussion approach was a helpful reading intervention to achieve literal and high-level comprehension, including the ability to critique and evaluate text content. However, the participants in the previous studies of QT were native English speakers. Therefore, the present study aimed to investigate its effect on Taiwanese college students. Two research questions were listed below.

1. Does QT group discussion approach influence college students' literal reading comprehension?

2. Does QT group discussion approach influence college students' high-level comprehension as evidenced by student-initiated discourse elements?

Method

Participants

Two classes were randomly assigned as a control and an experimental group, respectively. There were 38 students in the respective class, 20 female and 18 male students in the control group and 29 female and 9 male students

in the experimental group. They were eighteen and nineteen years old. All of the students were at higher intermediate English proficiency level based on a placement test administered by a national university located at northern part of Taiwan. Their proficiency was comparable to B2 level of Common European Framework of Reference for Languages (CEFR), which was a commonly used criterion for language proficiency worldwide. The students were non English major (mostly from college of humanities and education) and received two hours of freshman English course every week for 7 weeks in total in this study. The students have learned English for more than ten years and have experienced in group discussion activity in senior high schools.

Teaching Procedures

The students in both control and experimental group used the same designated textbook (*Q: Skills for* success *4*), but received different teaching interventions. The major differences were that the students in the experimental group received training on six types of questions in the first week as shown in Table 1: authentic, uptake, speculation, high-level thinking, affective, and connection questions (Murphy et al., 2017); definitions were shown in Table 2 (Full examples were presented in Appendix 1). In addition to the question lessons, the students were encouraged to give supports to their claims in their responses. Whenever the students made any claim about their feelings or thoughts, they were encouraged to give reasons, evidence or any kinds of supports to explicate their ideas.

Table 1 Teaching Schedule

Week	Control group	Experimental group
1	Grouping	Six question types introduction Grouping
2	Unit 1	Unit 1 (Question type practice: SQ and HLQ/Generalization)
3	Unit 1	Unit 1
4	Unit 2	Unit 2 (Question type practice: HLQ/Analysis and AfQ)
5	Unit 2	Unit 2
6	Unit 3	Unit 3 (Question type practice: Speculation and Connection question)
7	Unit 3	Unit 3

In the control group, the students had a traditional English reading class in which the instructor explained unfamiliar words and usages and interpreted English texts in Mandarin Chinese. After the explanation, the students conducted a group discussion in Chinese for about 20 minutes based on ten questions prepared by the instructor (Appendix 2). There were 10 groups in the control group (three to five students in a group). The students were then required to complete a comprehension test, which included five multiple-choice questions and

Table 2 Definitions for Six Question Types and Three Response Types

	Discourse element	Definition
1	Authentic Question (AQ)	AQs are open-ended and require thinking about, around, and with the text; there is no one "correct" answer.
1-1	Uptake Question (UQ)	UQs ask about something that someone else said previously. They must be content related and can be directed to a group or an individual.
1-2	Speculation Question (SQ)	SQs require students to consider alternative possibilities.
1-3	High-level thinking Question (HLQ) (Generalization and Analysis)	HLQs require students to build up ideas and generate new information by tying concepts and ideas together.
1-4	Affective Question (AfQ)	AfQs elicit connections between a student's life experience and the text.
1-5	Connection Question (CQ)	• CQs elicit connections to information that is commonly known in the discussion group. • CQs elicit connections between two or more textual materials.
2	Test Question (TQ)	TQs presuppose one or a set of "correct" answer(s); the answer(s) usually can be found in the textbook.
3	Responses	
3-1	Elaborated Explanations (EE)	EE consists of a statement of a claim and include at least two pieces of support (e.g., reasons or evidence).
3-2	Exploratory Talk (ET)	ET occurs when students share, evaluate, and build knowledge over at least three turns. Students reason collectively by challenging each other and responding to challenges with reasons and evidence.
3-3	Cumulative Talk (CT)	CT occurs when students build positively, but uncritically, on what others have said in episodes of at least three turns. Instances of cumulative talk do not include a challenge.

Source: Murphy et al. (2017, pp. 2-4).

three short answer questions (Appendix 3).

In the experimental group, the students also received vocabulary instruction on the meaning and word usages in Mandarin Chinese. After vocabulary introduction, the students in the experimental group read texts by themselves, and were required to underline important ideas and to write down comments or questions for about 30 minutes. After the reading, the students were required to propose two questions of one designated question type for practice. Two types of question were assigned for each unit. For example, they were required to propose two speculation and two connection questions in Week 6 on a group basis. There were 36 questions from 9 groups in the experimental group (four to five students in a group). These questions were submitted to the instructor in Week 6 and reviewed in the Week 7 in order to correct students' grammatical errors and confirm their understanding of question types. The assigned question types were presented in Table 1 above.

Before the group discussions, the students were required to recite 8 ground rules listed below (Davies & Meissel, 2015; Reninger, 2007; Reninger & Wilkinson, 2010; Soter, 2007).

1. Share our thoughts and listen to other's ideas
2. No need to raise hand to speak (One speaks at a time)
3. Interact with group members instead of your teacher
4. Respect others' points of view
5. If someone remains silent, ask him/her questions
6. It is OK to disagree with others' opinions
7. Raise new questions
8. Build connections between texts and self

They conducted the group discussions in Chinese based on the same ten questions and then completed the same comprehension test. Details of teaching procedures of each unit were shown in Table 3 below.

Table 3 Teaching Procedures in Unit 3

	Control group	Experimental group
Week 6	1. Warm-up (whole class discussion)	1. Warm-up (whole class discussion)
	2. Vocabulary introduction	2. Vocabulary introduction
	3. Guided reading (first half)	3. Silent reading
		4. Question types practice
Week 7	4. Guided reading (second half)	5. Review students' proposed questions
		6. Review ground rules
	5. Group discussion	7. QT group discussion
	6. Comprehension check	8. Comprehension check

Because the students needed time to practice and familiarize themselves with how to ask questions, how to give responses, and following the ground rules, only the group discussions in the third lesson (Unit 3) were analyzed and compared with the discussions recorded in the control group. Unit 3 described the lives author spent with her father and how she learned writing. The group discussions in the first and second lesson were treated as practice sessions.

Discourse Analysis

Data of the present study included two parts: the students' comprehension test scores and the students' group discussions. The students' literal comprehension was evaluated through a comprehension test, which included five multiple choice questions and three short answer questions. The former required the students to answer information about the text, such as "**what is the turning point of the author's life event?**", while the latter required the students to propose personal ideas and support one's idea based on the text, such as "**why**

does the author choose to have the same job as her father?" The analysis of the short answer questions was based on the following rubrics. When the students wrote a thesis statement and one kind of support (i.e., reason, evidence, example, or personal story), the student received two points (i.e., one point for thesis statement and one point for a piece of support). The students scored five points at most for each question. The research assistant graded the students' short answer questions for the first time and the researcher reviewed the grading for the second time. Agreement reached more than 90%. Figure 1 was one example of marking. There were two pieces of supporting ideas ("S") and one thesis statement ("T"), which were three points in total for this item.

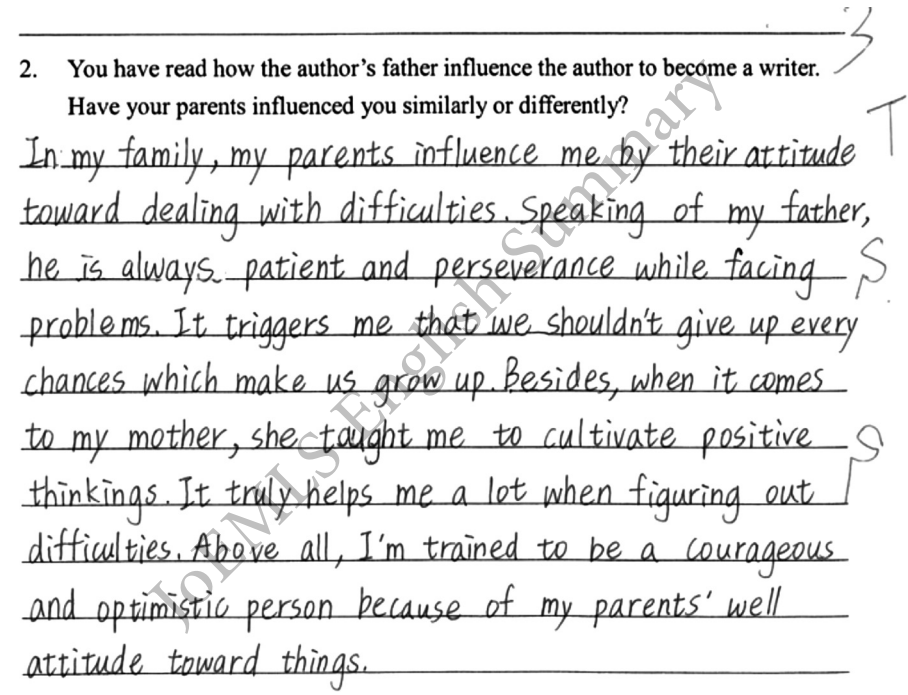

Figure 1 Sample of Short Answer Question Marking

For ease of scoring, the test was presented in terms of 100 points. For example, when a student got two multiple choice questions correct, then he got forty points out of 100; when a student got twelve points from the short answer questions section, then this student got 80 points out of 100 points. The comprehension test scores were the average scores of the two section.

The time of group discussions in Unit 3 were about 250 and 274 minutes in the control and experimental group, respectively. The average group discussion time was around 20 and 30 minutes for the control and experimental group, respectively. All of the students' group discussions were transcribed by the research assistant and analyzed by the researcher/instructor. Five discourse

indicators suggesting high-level comprehension were identified in the students' group discussions: authentic questions (AQs), test questions (TQs), elaborated explanation (EE), exploratory talk (ET), and cumulative talk (CT; Soter, 2007). AQs were sub-divided into five secondary question types: uptake, speculation, high-level thinking, affective, and connection questions. In order to conduct a statistical analysis, the discourse indicators were accumulated and presented in how many times per minute. For example, there were twenty-two AQs in eighteen minutes group discussion, so there was about one AQ per minute.

Results

Normality tests were first used to examine the students' comprehension test scores and the distributions of five discourse indicators of both control and experimental group. Only EE and CT discourse indicators were normally distributed. Therefore, an independent sample *t*-test was adopted to compare the two discourse indicators between the control and experimental group, whilst a Mann-Whitney U test was adopted to compare the comprehension tests and the other discourse indicators (i.e., TQs, AQs, and ET) between the control and experimental group.

The independent *t*-test was adopted to examine EE and CT discourse indicators and there was no significant difference between the students of control and experimental group as Table 4 shows.

Table 4 Independent *t*-test for EE and CT

	Control group		Experimental group		*t*-test
	M	*SD*	*M*	*SD*	
EE	0.25	0.15	0.21	0.14	0.41
CT	0.19	0.07	0.17	0.09	0.35

The Mann-Whitney U test showed a significant difference between the control and experimental group as shown in Table 5 ($Z = -2.10, p = .01$).

Table 5 Mean Scores of the Comprehension Tests

	Control group		Experimental group		Z
	M	*SD*	*M*	*SD*	
Comprehension tests	70.88	16.00	78.53	10.24	–2.10*

*$p < .05$.

The five discourse indicators were adopted to examine the students' high-level comprehension, "beyond a literal understanding" (Reninger & Wilkinson, 2010) and were compared between the students of the control and experimental group. The Mann-Whitney U test was adopted to examine AQ, TQ, and ET between the two groups. Whilst no significant differences were found in TQ and ET, a significant difference was found in AQ as shown in Table 6.

Table 6 Mann-Whitney U Test for AQ, TQ, and ET

	AQ	TQ	ET
M	0.18	0.06	0.05
SD	0.20	0.07	0.04
Mann-Whitney U	16.00	39.50	35.00
Wilcoxon W	71.00	84.50	80.00
Z	–2.38	–.46	–.832
Asymp. Sig. (1-tailed)	.008*	.333	.217

*$p < .05$.

Discussion

Literal Comprehension

The significant difference between the control and experimental group suggested that the students of the experimental group had better literal understanding than the students of the control group. This might be due to the fact that the students in the experimental group were required to always give supports to their claims during the group discussions. Therefore, they had to re-read the text and extract examples or information from the text in order to support their thoughts and ideas. By doing so, the students were able to demonstrate better literal comprehension (i.e., **be able to locate and recall**).

Example 1 below demonstrated how the students in the control and the experimental group performed very differently in response to the same discussion question: "**How does the author's father influence the author?**" (All examples were translated from Chinese to English. The Chinese of Example 1 was presented in Appendix 4) The students in the experimental group have adopted examples from the text or personal experience to support their ideas, such as Student 1's turn in line 5-8, whereas the students in the control group did not.

Example 1

[Control Group 2]

Q: How does the author's father influence the author?

1. Student 1: The author's father influence her by... by showing how to do.
2. Student 2: Learning by osmosis.
3. Student 3: Lead by examples.
4. Student 1: Yes! Learning by osmosis.

[Experimental Group 1]

5. Student 1: This is from their daily life... She saw her father go nowhere...
6. didn't go to work. She lived with her father every day... her father made her
7. breakfast... and kept her company. This was how her father gradually influence
8. her... Right?!
9. Student 2: Influence her exactly what?
10. Student 1: It is... I cannot tell specifically.
11. All students: [Laughing]
12. Student 3: I believe that (that) her father is her significant others... who had

13. great influence on her. A writer's child does not necessarily become a writer...
14. But when she observed her father writing every day... and I am wondering if
15. she would like to do the same job as her father.
16. Student 4: So, what you wanted to say was that... (inaudible)... (it was the)
17. process that made the author become interested in writing?
18. Student 3: Exactly! No matter Whether you are truly interested in one type of
19. job is another issue... When your parents or relatives were having the same
20. job, they were doing it every day... and then... it is possible that you want to be
21. in that position or job just like them... This is like a kind of imitation.
22. Student 4: So, just like a doctor family. All of the members in one family are all
23. doctors.
24. Student 3: You are right!
25. Student 1: Do you think her father... have her... expect her to become a writer?
26. Did her father do... train the author intentionally?
27. Student 4: I don't think her father do that on purpose.
28. Student 2: I agree... kind of let this happen naturally...
29. Student 3: I think maybe a little bit... because... because... her father brought her
30. to jail... and taught her writing with the prisoners. This event makes me think
31. that her father do (have some expectation for her daughter to become a writer.)
32. Student 2: From the author's description... her father may simply brought her
33. there without much expectation on that matter.

Example 1 further demonstrated how the students used language as a mean to learn, share knowledge, and reason problems together (Mercer, 2002). In this discussion, Student 1 of the experimental group first gave one's personal opinions on how the author's father influenced his daughter through his everyday behaviors, such as staying at home all day or always making breakfast for her in line 5–8, but Student 1's responses seemed unclear to Student 2 in line 9. Therefore, Student 3 further clarified Student 1's thoughts by proposing the idea of "significant other" in line 12–15. This idea was required to be clarified by Student 4 in line 16–17. Student 3 tried to explain more by making a connection to his personal experience, explaining how one will be influenced by the people around them, and concluding why the author would like to have the same job as her father in line 18–21. Student 4 agreed with Student 3's view point in line 22–23. In the discussion, students shared their ideas toward this question and they clarified doubts, developed logic, and tried to reach an agreement among members in the process of the discussion.

In contrast, the students in the control group did not provide any reason or explanation for their claims. There was no support for their statements and they completed their discussion within four turns and around 30 seconds. This example can be used to support that although a group discussion approach was theoretically effective for the students to share their ideas and knowledge and improve literal comprehension and high-level thinking (Rogoff, 2008; Wells, 1999), the students needed knowledge and training before discussions (Davies &

Meissel, 2015; Higham et al., 2014; Li, Murphy, & Firetto, 2014; Li et al., 2016; Mercer, 2002; Reninger & Wilkinson, 2010; Soter et al., 2008)

This finding to some extent challenged traditional style of lecturing, teachers giving detailed explanation or even translation, as indicated by the lower comprehension test scores of the control group. When the students learned how to conduct effective group discussions, were given responsibility to read texts, and were given more power over the discussion, they can learn more from the discussion processes. They not only understood the text content better, but also learned to share and supported their ideas. Therefore, it can be concluded that the QT discussion approach can possibly influence students' literal comprehension.

High-Level Comprehension

Having more AQs is very important for effective discussions and high-level comprehension (Li et al., 2016; Nystrand et al., 2003). Questions are viewed as "sites of interaction" (Nystrand et al., 2003; Wilkinson, Reninger, & Soter, 2010). When the students produced more AQs, it demonstrated their understanding and contribution to the interactions as shown in Example 2 below. Student 4 proposed a series of AQs (in line 6 and 8) to encourage Student 3 to provide more information related to what kind of writings Student 3 has involved in.

Example 2 [Experimental Group 1]

Q: What benefits can writing bring to a person?

1. Student 3: I thinking writing gives you a way of expressing one's... Ah
2. emotions. Before writing you may... you may notice nothing. But when you
3. need to write you will try to observe... this is a great way to release pressure.
4. Student 4: Have you tried to write? [AQ]
5. Student 3: Ah... Not very often... I will try another kind.
6. Student 4: Which kind? [AQ]
7. Student 3: Anything related to art... Writing is a type of art.
8. Student 4: Right...
9. Student 1: Is diary a type of writing? [AQ]
10. Student 3 and 4: Yes, I think so.

Among five discourse indicators, the use of AQs was significantly different between the control and the experimental group. Among five secondary question types (UQs, SQs, HLQs, AfQs, and CQs), it was found that the students in the experimental group used far more UQs (about double) than that of in the control group as shown in Table 7. UQs were follow-up questions that required individuals/respondents to give more information. The more use of UQs might suggest more interactions among the students during the group discussions. For example, two students asked two UQs (in line 5 and 8) in order to know more about Student 2's ideas on the independence (in line 1) as shown in Example 3.

Table 7 Numbers of Questions per Minute

Question types	Control group	Experimental group
Uptake	0.11	0.25
Speculation	0.00	0.04
High-level thinking	0.07	0.07
Affective	0.00	0.02
Connection	0.00	0.02

Example 3 [Experimental Group 3]

Q: What is the most important thing your parents teach you?

1. Student 2: I think... Independence. I have to decide a lot of things by myself.
2. My families are are busy... They don't have time... I was forced to be
3. independent. Just like... like going to school or cram school. I made decisions
4. by myself. Right, I decided on my college. Hahaha
5. Student 1: That sounds great. You were free and disciplined.
6. Student 2: I think choice... choosing colleges is the most important. I made
7. my own decisions. Right!
8. Student 3: Did your parents give you any suggestion? [UQ]
9. Student 2: That is... you should be responsible for your selection.
10. Student 3: It seems like...
11. Student 1: Do they support your decision? [UQ]
12. Student 2: Most of the time... But when I was absolutely sure of something...
13. they will show respect for my decision.

Except for AQs, no significant difference was found in other discourse indicators (i.e., TQ, ET, EE, and CT) between the control and the experimental group. This result did not necessarily suggest that the QT discussion approach was less helpful for high-level comprehension because the data of the present study included only discussions of Unit 3. It was possible that the students have learned to ask more AQs, but have yet mastered unfamiliar styles of communication (Davies & Meissel, 2015). For example, Exploratory Talk (ET) consisted of the students' challenges toward others' claims and followed by rebuttals in a dialogue. Both groups of students rarely used challenges in response to others' statements. It was thus speculated that the students were not yet familiar with "challenges" or "disputes". Example 4 below was a typical interactive pattern when the students were confronted with "challenges" or "disputes". Student 3 did not agree with Student 4's statement in line 5–8. However, when Student 2 expressed different opinions in line 9–10, Student 3 did not further explain one's ideas. This dialogue ended and the students continued with another discussion question. This short example demonstrated how Taiwanese students typically reacted to "challenges" or "disputes". Although a few challenges appeared, most of them were about different interpretations of the text (Example 4) or disagreement (Example 5).

Example 4 [Experimental Group 6]

Q: What is the most important thing the author's father teach her? Why?

1. Student 2: ... her father taught her...
2. Student 4: but he (student 4's father) taught me too mostly by example!
3. Student 2: the creative writing program...
4. Student 3: the answer lies in the third phrase.
5. Student 2: I think he taught her to read poetry and then be bold, be original, and... let ourselves
6. make mistakes. [challenge]
7. Student 1: It should be the last part on page 66. "... he helped the prisoners and me to discover
8. that we had a lot of feelings and observations and memories and dreams and opinions we
9. wanted to share..." Writing requires these qualities. Writing requires interactions with
10. oneself... To be able to observe and write them down.

Example 5 [Experimental Group 1]

Q: What qualities should a writer have?

1. Student 4: Appreciate being alone... emotional...
2. Student 3: If it is me... But why appreciation for being alone is important
3. quality for writers? If a group discussion over a writing task can also be part of
4. writing, too. [challenge]
5. Student 4: Right...
6. Student 2: Why do you think writers should appreciate being alone?
7. Student 4: Hmm... I think so because of the image of writers. They will usually
8. stay alone in a café... and observe others... and observe the environment, and
9. write their own stuff.

Furthermore, it was interesting to observe again Student 4's responses as shown in Example 5 above. Student 4 first proposed one's personal opinions toward the discussion question in line 1 and was refuted by Student 3 using one example in line 2–4. Although Student 4 can voluntarily further argued for one's personal opinions, one did not do so. Instead, Student 4 explained one's viewpoint only after when Student 2 asked a follow-up question. In this example, it seemed that a socio–cultural issue, facework (first proposed by Goffman, 1959), may cause student 4's reluctance to respond to the challenge. The construct of facework included maintaining one's and others' face during interactions. Taiwanese students were likely to avoid challenging others' ideas or opinions in order to save others' face and to remain silent when confronted with challenges in order to save theirs.

Because the challenges were not preferable styles of interaction for Taiwanese students, a typical interaction was that they tend to paraphrase others' idea in order to reach most possible agreement among members in the group. This was supported by more Cumulative Talk (CT) from both groups. In Example 6, Student 1 first pointed out that the author should be very observant and must have observed everything in her everyday lives, since her father was a writer in line 1–4. Student 2 and 3 paraphrased and extracted specific examples from the text to support Student 1's claim in line 5–6 and 7–9, respectively. Then, Student

3 made a conclusion based on the interactions. This was the typical interactive pattern, CT, in Taiwanese students' text-based group discussions. The different use of ET/CT discourse indicators found in the present study seemed to be the typical interactive style in Taiwanese students because such differences were not found in Davies and Meissel (2015) or Li et al. (2016).

Example 6 [Experimental Group 5]

Q: How does the author's father influence the author?

1. Student 1: Her father's job was a writer... so so she was also very observant.
2. She observed and learned from her father... when she was young. Also, her
3. father also taught her to live... experience everything in life. Write whatever
4. she wanted to.
5. Student 2: I think the influence was... was from the everyday life and... what
6. he had done. The author watched... lived... and learned from her father.
7. Student 3: This is more observational. The author observed whatever her
8. father did in everyday life. Her father got up early in the morning and did daily
9. routines. Was her father a writer?
10. Student 2: Yes. He taught writing in jail.
11. Student 3: Through the author's observation on her father's everyday behavior,
12. she had some thoughts on... and made some reflections... This is how the
13. author was influenced by her father.

Conclusion

There were two major findings based on the results of the present study. First, QT group discussion approach was an effective text-based discussion approach to facilitate students' literal comprehension compared with monologic lecturing style. After the students received discussion instructions, were given responsibility of text comprehension, and were given power over discussion, they showed a good understanding of the text (i.e., be able to **recall** and **integrate** text information). Therefore, it is suggested that teachers provide more chances for students to create dialogic interactions in class. Secondly, the students demonstrated high-level comprehension by using more authentic questions in the group discussions. Furthermore, it was also found that Taiwanese students consistently used more CT over ET possibly because the students felt that it was culturally inappropriate to challenge each other.

An inherent limitation was due to authentic classroom settings. In QT teaching approach, teachers participate in students' group discussion and play a role as facilitator. The researchers made a modification that the teacher took turns to participate in group discussions because of practical concerns without compromise with QT teaching principles. In QT teaching, teachers' participation in the group discussion should be gradually decreased and students have the ownership of text interpretation. Therefore, this partially explains why the researchers only use Unit 3 for data analysis.

The other limitation was relatively few test items. The researchers made such decision because of two concerns: time and aim of the test. First, two weeks to complete a QT discussion teaching procedure has been seriously discussed and decided to be the best plan in college contexts. Including more test items meant taking more time on comprehension tests, which may cause a delay of schedule. Second, the goal of the test was to ensure whether the students understood the main idea of the text instead of details.

Although this study provides a preliminary result on the effects of dialogic style on Taiwanese students' literal and high-level comprehension, it is interesting to explore whether students will acquire different styles of communication (e.g., EE or ET) when they have more time to practice QT. Moreover, since QT is a new discussion approach, it will be interesting to further explore how other factors possibly influence its effect, such as the language used during discussions, the number of participants in a group, teacher's engagement in the discussion, or types of text.

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Appendix 1

Examples for Six Question Types and Three Response Types

	Discourse element	Example
1	Authentic Question (AQ)	*Q: "What did you think was worse: the Titanic or the Edmund Fitzgerald?* *R: "I thought the Edmund Fitzgerald was worse because they went sailing when they were not supposed to. It was only a couple of years ago, so it should have been more advanced and prepared."*
1-1	Uptake Question (UQ)	*Q1: "What if Paul Revere failed his mission?"* *R1: "That would be really bad. Maybe... the British would take over..."* *Q2: "Would he be as popular?" (Uptake)* *R2: "No. I think we would be overruled by the British today though. It would not be too bad, like Britain today is not that bad. No one would like, tell us what to do. We just would not be as strong as a country."*
1-2	Speculation Question (SQ)	*Q: "What if the big horse did not get destroyed?"* *R1:"Then I think he would have been a lot happier."*
1-3	High-level thinking Question (HLQ) (Generalization and Analysis)	*Q: "How would you describe the Queen of the Sea?"* *R:"I think I would describe her as a nice, humble lady because her daughter was suffering, and she gave her what she needed to stay with her husband."*
1-4	Affective Question (AfQ)	*Q: "How would you feel if you were trying to solve the case in the story?"* *R:"I would feel a lot of pressure and stress because everybody would be looking at me, and usually, I do not do very well on stage because I have stage fright."*
1-5	Connection Question (CQ)	*Q: "What did you think of the talent show?"* *R: "It was good but kind of childish. I think our talent show had a lot more singing and stuff like that in it. We even had someone do baton."*
2	Test Question (TQ)	*Q: "What was their initial goal for inventing the machine?"* *R: "That they would get first place in the science fair."*
3	Responses	
3-1	Elaborated Explanations (EE)	*R: "I would probably feel pretty fortunate [claim] because my family was given the opportunity to go out west and start this new life [reason]. I would not think of the chores as boring. I would think of them as fun because of the space I had to do them in [reason]."*
3-2	Exploratory Talk (ET)	*Q: "Does Seeker of Knowledge remind you of Navajo Code Talkers?* *R1: "This story does remind me of Navajo Code Talkers because they are both codes. I mean, this one is on paper and it was hard for them to figure it out and the Navajo code talkers had to figure it out and stuff."* *R2: "I disagree, because in Navajo Code Talkers it's all about 29 men trying to figure out one code, and in this story, it is one man trying to make his dream come true about discovery. And in Code Talkers it's about 29 men trying to figure a code out so other people would not know what they are saying, and this is about one man trying to break the code, so people would know who he was.* *R1: "But it says in the story that there were many other people... like, scholars and Napoleon were also trying to figure it out."*
3-3	Cumulative Talk (CT)	*Q: "Why did Tony buy back his grandma's bracelet."* *R1: "Because he knew that his grandma was feeling really sick and that she missed her bracelet. He wanted to get it back for her so that she would not be as sad about being sick."* *R2: "Because she had had the bracelet for a long time."* *R3: "She had a lot of good memories of it, so it would help her not be so sad"*

Source: Murphy et al. (2017, pp. 2-4).

Appendix 2

Ten Questions for Group Discussion

1. How does the author's father influence the author? (HLQ)
2. What do you think of the author's personality? (HLQ)
3. What is the most important thing the author's father teach her? Why? (HLQ)
4. What benefits can writing bring to a person? (CQ)
5. What qualities should a writer have? (HLQ)
6. What qualities should a story teller have? (HLQ)
7. What qualities should parents have? (HLQ)
8. To what extent, do you think parents influence their children? (HLQ)
9. What is the most important thing your parents teach you? (CQ)
10. Have you thought about having the same job as your parents? Why? (CQ)

Appendix 3

Reading Comprehension for Unit 3

Unit 3 Bird by Bird 姓名_____學號_____

Choose the best answer for each question.

( ) 1. Which of the following statements is **CORRECT**?
A. The author's father enjoy teaching at the Prison.
B. The author and her father share common interests.
C. The author never figure out how to make her story telling interesting.
D. The author thought writing down ideas is not difficult.

( ) 2. What is **NOT** true about the author's father?
A. He has a nice office job.
B. He wakes up early every morning.
C. He enjoys writing a lot.
D. He cares a lot about his family.

( ) 3. What did the author's father **NOT** teach her about how to be a good writer?
A. To pay attention to our surroundings.
B. To start the habit of writing as early as possible.
C. To read books or plays that are consider great work.
D. To be bold and original.

( ) 4. Which one of the following is **NOT** the gift of being a writer as mentioned in the article?
A. To have the excuse to do things.
B. To go places and have chance to explore.
C. To pay close attention to the things happen around you.
D. To be funny and love to read.

( ) 5. What is **TRUE** about the author?
A. She hoped that her father could work at home.
B. She dislike writing because of fly in the ointment.
C. She was inspired to become a writer because of her father.
D. She decided to become a writer when she was young.

Answer the following questions with thesis statement and supports

1. After reading the story, why does the author choose to have the same job as her father?

_____
_____
_____
_____

2. You have read how the author's father influence the author to become a writer. Have your parents influenced you similarly or differently?

_____
_____
_____
_____

3. Do you think parents are children's best teachers in life? Why or why not?

_____
_____
_____
_____

Appendix 4

Example 1 in Chinese

[Control Group 2]

問題：你認為作者的父親如何影響作者？

1. Student 1：藉由親身實行，就是……親自……就是（就是）自己做然後……示範給作者看。
2. Student 2：耳濡目染。
3. Student 3：以身做則。
4. Student 1：對耳濡目染。

[Experimental Group 1]

5. Student 1：應該就是從日常生活中……就是他看到他父親都沒有去…就是出去
6. 上班。因為他每天都會看到他父親……幫他們做早餐什麼之類的…所以就逐漸
7. 影響到作者，這樣嗎？
8. Student 2：影響了他什麼啊？
9. Student 1：就是……我也不知道……
10. All students：哈哈呵呵！
11. Student 3：我覺得就是在……他就是在這種，就是他小時候的重要他人。帶給他
12. 的影響是非常巨大的，他不一定是從事作家這個行業，他可能每天看父親
13. 寫作，然後就是自己也會想要嘗試看看那種東西。
14. Student 4：所以就是你覺得他是這樣子的過程來引發他（inaudible）對自己寫作
15. 的那種興趣？
16. Student 3：對拉就是！不管有……你是不是真……就是……一定對它非常有熱忱。
17. 你看到父母都在從事那個行業，也不一定父母，反正就是你父親或母親其中
18. 一個，然後你每天看到他這樣……這樣做他的這樣的工作。你可能也會就模仿
19. ……這是一種模仿的行為。
20. Student 4：所以就有點像醫生世家阿那種。
21. Student 3：欸對！
22. Student 1：那你覺得就是他爸爸對他有……就是……也可以當作家的期望嗎？
23. 就是他爸爸有……就是刻意的要影響作者去……？
24. Student 4：我覺得沒有刻意耶。
25. Student 2：我覺得還好欸……有點順其自然的發展的感覺。
26. Student 3：是他爸爸也有……可是……把他跟那些就是……就是……在監獄裡面那些
27. 犯人，就是抓來跟他們一起教寫作文。我覺得還是有一點期望。
28. Student 2：感覺是帶著他去……就他的態度好像也不算到期望的感覺。

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JoEMLS 註釋（Notes）暨參考文獻（References）羅馬化英譯說明

2015年1月31日修訂

1. 本刊針對部分國外西文專業資料庫之引文索引建檔與中文辨讀之需求，凡屬中文稿件之英文摘錄末，特別增列中文羅馬化拼音之「註釋」（或「參考文獻」）一式。
2. 作者（含團體作者）、機構名稱（出版者）、地名（出版地）：依事實與習慣為英譯，如無法查證時，中國大陸地區作者以漢語拼音處理，台灣以威妥瑪拼音（Wade-Giles system）處理。
3. 出版品、篇名：採用（登載於原刊名、篇名等之正式英譯）照錄原則；若原刊文無英譯，則由本刊依漢語拼音音譯著錄之。
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   林雯瑤、邱炯友（2012）。教育資料與圖書館學四十年之書目計量分析。教育資料與圖書館學，*49*（3），297-314。【Lin, Wen-Yau Cathy, & Chiu, Jeong-Yeou (2012) A bibliometric study of the *Journal of Educational Media & Library Sciences,* 1970-2010. *Journal of Educational Media & Library Sciences*, *49*(3), 297-314. (in Chinese)】

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