# 成果報告

教育部教學實踐研究計畫成果報告

Project Report for MOE Teaching Practice Research Program

計畫編號/Project Number：PSL1121791

學門專案分類/Division：社會(含法政)

計畫年度：V 112 年度一年期 □111 年度多年期

執行期間/Funding Period：2023.08.01 – 2024.07.31

## 計畫名稱: 運用網絡協作註釋改善行政學閱讀

## /Title of the Project: Improving Reading in Public Administration through Online Collaborative Reading Annotation

配合課程名稱: 行政學 I & 行政學 II

Courses: Public Administration I & Public Administration II

計畫主持人(Principal Investigator)：劉康慧 Helen K. Liu

執行機構及系所(Institution/Department/Program)：國立台灣大學 / 政治學系 (Department of Political Science / National Taiwan University)

成果報告公開日期：v 立即公開 □延後公開

繳交報告日期(Report Submission Date)：2024 年　8 月　3 日

# 運用網絡協作註釋改善行政學閱讀 / Improving Reading in Public Administration through Online Collaborative Reading Annotation

## 一、本文 (Content)

### 1. 研究動機與目的 (Research Motive and Purpose)

The issue of students neglecting pre-class readings was well-known to instructors, despite evidence suggesting its positive impact on active learning (Ryan, 2009). Studies showed only a minority of students completed assigned readings (Deale & Lee, 2022). While students could contribute to innovative teaching, their reading ability posed a fundamental challenge. Reasons for not completing readings included comprehension difficulties, low self-confidence, and lack of interest (Lei et al., 2010). Students might also perceive readings as irrelevant to class discussions or not worth their time. Instructors, often projecting their own experiences, might overestimate students' dedication (Hobson, 2014). Social and cultural factors like prior experiences, years in the university, and language background also influenced student engagement with readings.

### 2. 研究問題 (Research Question)

As mentioned earlier, the adoption of collaborative annotation reading system increased reading (Kumara and Kumara's 2007), improve reading behaviors (Lim 2020; Khongtim, J. 2021; Onyeje et al. 2022) and learning outcomes (Chen et al. 2020; Hwang et al.'s 2007; Yang et al. 2013). Given these empirical evidences supported from the previous studies on adoption of wikis, this study formulates the follow questions:

- How will an online collaborative reading annotation system affect students' reading outcomes for the class?
- How will an online collaborative reading annotation system affect students' reading behaviors beyond the class?
- How will an online collaborative reading annotation system affect students' learning outcomes?
- What will be the patterns of students' annotation through an online collaborative reading annotation system?

### 3. 文獻探討 (Literature Review) (from the proposal)

*"Digital Reading at the University Level*

Increased internet usage and digital readings at an undergraduate level have had clear positive outcomes for the learning process. Internet usage has increased access to information, reduced workloads of teaching instructors and students, broadened the scope of learning possibilities and research areas for students, and facilitated broader communication in the academic community. Simultaneously, however, there have

adverse effects on student learning, of which the effect on students' reading of course materials and readings is one.

One effect is the distraction and supplanting of time in students' daily lives. The internet also occupies time in students' days, such as social media, video streaming, and news websites. It has replaced time when students previously may have used the same time to read for pleasure and academic purposes. As a result, the internet is supplanting students' reading time has been argued to have had a significantly negative influence on the reading habits of students (Onyeje et al., 2022). Additionally, Khongtim (2021) found that on entering undergraduate studies, students preferred to use the internet rather than reading print materials for easy access. However, the time spent on the internet is mainly spent on social activities rather than on academic purposes (Khongtim, 2021). The internet in itself has changed the reading habits, therefore, of undergraduate students. Khongtim's study also revealed that the time spent on reading, even at the undergraduate level, was less than 2 hours per day and less than one hour per week for recreational reading. Khongtim found students found readings as a whole to be tedious and complex and were not motivated to do it compared to other activities.

However, what is more, important to understand is how digital and internet mediums affect the learning process. Khongtim (2021) drew out multiple factors affecting reading in her study in Table 1:

**Table 1.** Positive and Negative Effects of Digital Reading (modified by Khongtim 2021)

| **Positive effects on reading** | **Negative effects on reading** |
|---|---|
| 1) Teamwork of parents and teachers | 1) Non-availability of textbooks & high costs |
| 2) Family members' reading and encouragement | 2) Stressful school programs, busy timetables and schedules of studies |
| 3) Availability of well-functioning libraries and trained librarians | 3) Distraction from the information technologies like computer games, social networking sites etc. |
| 4) Encouragement from teachers | 4) Engagement on other activities |
| 5) Purchasing of books, comic books, story books at home | 5) Lack of well-functioning libraries and trained librarians |
| 6) Subscribing to newspapers, journals, magazines | 6) Obsolete library collections |
| 7) Availability of reading activities in the schools/educational institutions at least once a week | 7 Lack of reading activities in the schools educational institutions |
| 8) Awareness on different kind of reading materials | 8) Family and friend background like parents qualifications, friends circle, etc. |

*Available Online Collaborative Technologies*

Instructors increasingly adopt available online collaborative technologies, such as annotation and highlighters, to improve students' reading for the class. For instance, Hwang et al. (2007), one of the classical studies using a quasi-experiment (N=70), shows that the influence of annotation on learning performance becomes more robust with the sharing function. Similarly, Yang et al. (2013) adopted a Sharing Unique Reading Feeling tool, a collaborative annotation tool, to test the effect of collaborative annotation on students' Chinese reading levels (surface vs. deep reading) (N=66). They found that collaborative annotation tools not only increase the frequency of surface reading but also improve deep reading and the quality of comprehension (Yang et al., 2013).

In a recent study, Chen et al. (2020) adopt a web-based collaborative reading annotation system to promote Taiwanese students' reading and comprehension performance. Their quasi-experimental results (N=55) show that higher-quality annotations statistically significantly affect students' reading comprehension. However, there is little evidence to show how it will work at the university level in the field of public administration and how it will address the reading challenges discovered by the PI.

*Print Readings Versus Digital Formats*

Furthermore, a wealth of literature focuses on the efficacy of digital versus in-print readings concerning learning outcomes (Baron, 2021; Fontaine et al., 2021; Tajuddin & Mohamed, 2019). Many education scholars have examined this question and conducted different experiments across different age groups and nationalities. The results from recent years are mixed, suggesting the need for further research.

To provide a quick demonstration of the conflicting evidence, Tajuddin and Mohamed (2019) recommended that students read on a screen to achieve better comprehension. In order to read quickly, they should read print formats. One paper concerning this debate in the context of health professional education found little to no difference between print and digital reading (Fontaine et al., 2021). However, in Baron's 2021 paper, Baron argues that reading in print is more effective for learning than in digital formats. She gives two reasons for this: 1) the properties of paper and the ways we interact with it; 2) readers' mindsets about the mental demands of reading print versus digital material (2021, 18). Baron also suggests how people approach reading matters in her book How We Read Now. If people think reading will be easy, they will put less effort. As stated, many more papers analyze this question with varying results.

Specifically, concerning printed handouts in lectures, one study by Wongkietkachorn et al. (2014) found a significant effect on learning outcomes from lectures when handouts were not provided. Their results found less concentration in lectures without handouts, and note-taking decreased by 38.3% from 89.7% to 51.4%, with a statistically significant increase in class-skipping behavior. The absence of handouts also resulted in a rise in photocopying peer lecture notes with no significant increase in either self-directed or peer learning.

With the debate over print versus digital reading, there is a related argument over using electronic devices for note-taking compared to traditional pen and paper note-taking. Studies have shown that students who take notes on laptops perform worse in exams than those who use longhand (Mueller & Oppenheimer, 2014). Those using longhand

wrote fewer words than those using laptops. Moreover, it is well recognized that using digital devices can lead to distractions such as pop-ups or messages, which break the flow of concentration. Scrolling on the page also takes more mental work than reading a page that is not moving. One suggestion is that anything that requires effort or careful reading should be printed. The article's length has also been explored by Alexander and Singer (2017), who found that for articles over 500 words, print readings gave higher comprehension scores."

**4.** 教學設計與規劃 (Teaching Planning) (from the proposal)

"This research project aims to test the effects of an online collaborative reading annotation system on students' reading outcomes, reading behaviors, and overall learning outcomes. We also examine if there is a moderating effect from a paper format reading on the effects of an online collaborative reading annotation system on the above effects. Finally, we also examine the quality of students' annotation through the online collaborative reading annotation system.

The objectives of the course are for students to gain an overview of both issues and practices related to the public administration. The course focuses on the environment, values, and core functions of public administration. The course explores: (1) how various government agencies run; (2) dynamics between government and politics; (3) relationships between government, market, civil society, and citizens.

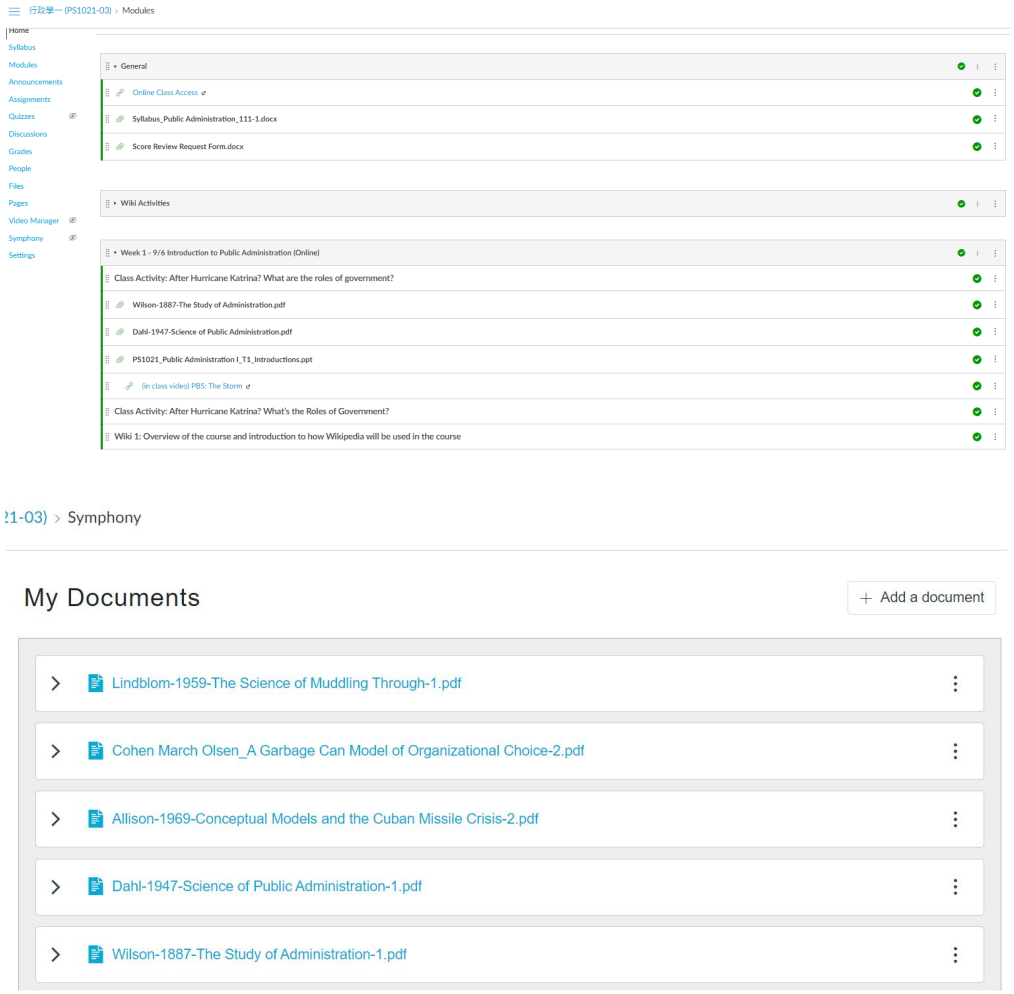
Additionally, at the end of the course, students should: (1) describe the major theories and content of public administration; (2) recognize the functions of public administration, such as decision making, accountability, and performance evaluation in the public sector; (3) apply different policy tools and framework to examine the current public policies and public affairs in the local and international context.

We conducted a pre-and post-surveys to examine the effects of an online collaborative reading annotation system in the Public Administration I & Public Administration II courses (Figure 1). At the beginning of each class, we gave a 30-minutes of instruction regarding the operation of the online reading system by NTU COOL. NTU COOL is an online web-based learning platform. It has a specific annotation reading function called, Symphony, as shown in Figure 5. Our research team informed all the students about the research purposes and procedures at the beginning of each class. Also, we submitted the ethnic review application before we begin our study.

Also, Figure 1 illustrates a virtual learning space for students to access reading and class materials. We utilized the NTU COOL system for the students to access readings and class materials, as shown in Figure 5. The NTU COOL system allows students to comprehensively view the class, including weekly topics, reading materials, case studies, and discussion questions at any time. Registered students are required to log in and access all the class materials.

Additionally, at the bottom of Figure 1, we show the function of the NTU COOL system, known as the Symphony. This function enables students to access all the required reading at once (like a reading package). Furthermore, Symphony allows students to collaborate, annotate texts and provide comments or questions on the required readings."

Figure 1 The NTU COOL online collaborative annotation reading system-Symphony




## 5. 研究設計與執行方法 (Research Methodology) (from the proposal)

"Introduction courses, such as the Public Administration I & II, are suitable for testing the effects of an online collaborative reading annotation system on reading, which enable students to obtain fundamental knowledge in a professional field. According to the syllabus, the purpose of the course is to introduce students to the fundamental concepts and theories of public administration. Since reading comprehensive is essential for the completion of the courses, these courses are suitable for testing the effects of an online collaborative reading annotation system on reading performance, behaviors, and learning outcomes.

An introduction to Public Administration course at the National Taiwan University was selected to recruit the participants. Usually, an even distribution of gender between males and females is expected. About 50% or more of the students are from oversea. Our survey includes basic information, such as gender, age, nationality, first/second languages, major(s), and other essential information as a control for the background characteristics of the studied subjects.

*Pre- and post-survey*
To assess the adoption of an online collaborative annotation reading system, this study adopted a survey instrument developed by Kumara and Kumara's (2007) measurements on reading habits and Hwang et al.'s 2007 assessment of collaborative annotation reading. See Appendix I at the end of the proposal for a sample survey instrument. Hwang et al.'s (2007) assessment include questionnaires to measure experiences from the online collaborative annotation reading and a self-assessment of the system's usefulness. Given that peer interaction is critical for our assessment, Hwang et al.'s (2007) assessment provide an excellent framework to capture peer interaction compared to Chen et al.'s (2020) study. Therefore, this study adopted a set of pre- and post-survey to measure (see Figure 6): reading habits, reading abilities, the purpose of reading, collaborative annotation evaluation, perceived usefulness, comparison of print with internet sources, and basic information."

## 6. 教學暨研究成果 (Teaching and Research Outcomes)

### (1) 教學過程與成果

*Pre- and Post-Survey*

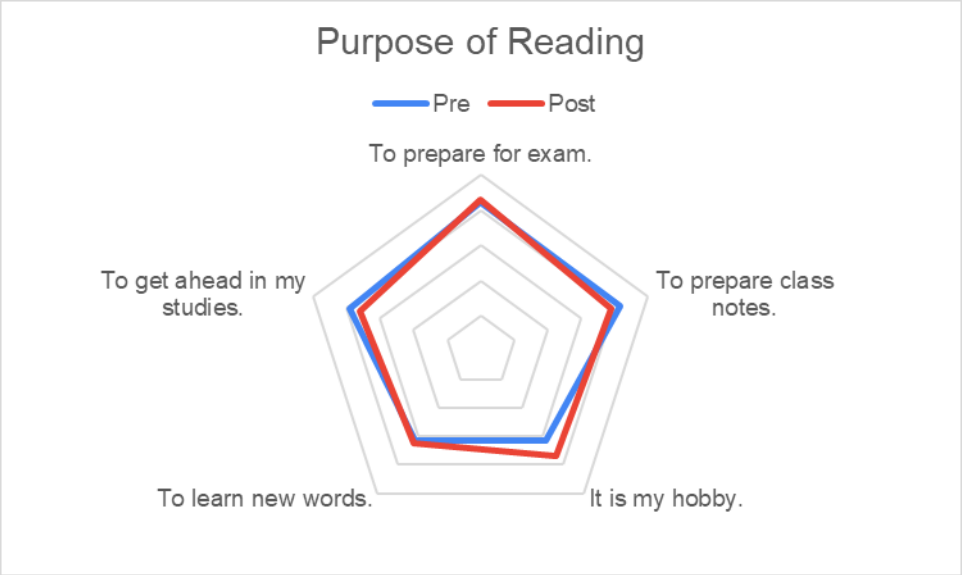
*Reading Patterns-Reading habits and Internet Usage*
According to the pre-survey in Table 1 in the Appendix, 36.363% of students spent less than 2 hours, 56.818% spent about 2-5 hours, and 6.818% spent more than 6 hours on the PA II class reading per week. Meanwhile, 11.363% spent less than 2 hours, 31.818%, spent about 2-5 hours, and 56.818% spent more than 6 hours for reading outside the PA II class. Additionally, 86.363% reported more than 6 hours of internet usage per week.

Interestingly, according to the post-survey in Table 1 in the Appendix, 44.444% of students spent less than 2 hours, 50.000% spent about 2-5 hours, and 5.555% spent more than 6 hours on the PA II class reading per week. Comparing to the pre-survey, the time spent for reading PA II material have decreased on average. This might indicate that students are able to prepare the class reading more efficiently after a semester of training. Meanwhile, 16.667% spent less than 2 hours, 33.3333%, spent about 2-5 hours, and 50.000% spent more than 6 hours for reading outside the PA II class. Again, the reading time has become more efficient for outside the PA II class when comparing to the pre-survey. Additionally, 83.333% reported more than 6 hours of internet usage per week.

*The purpose of reading*

To understand the purposes of reading of students, Figure X illustrates the average of the pre and post scores for the purposes of reading. The results of each individual survey item show that the scores for the purposes of reading increased in the items of to prepare for exam, it is my hobby, and to learn new words after using the online collaborative annotation reading system, as shown in Figure 2. In particular, the highest increase in score is the hobby of reading.

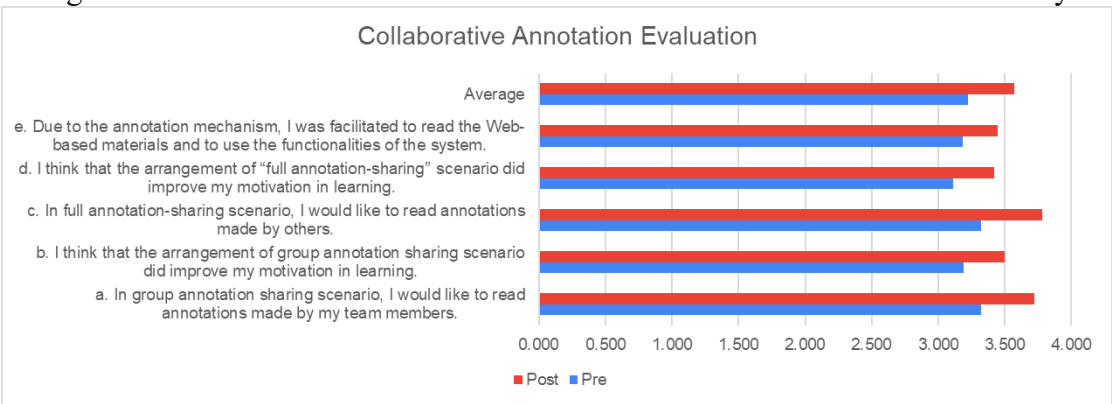
Figure 2. The Scores on Purpose of Reading from the Pre-and Post-Survey




*Collaborative annotation evaluation*

A one-way multivariate analysis of variance was conducted to compare the survey responses of subjects who participated in the online collaborative annotation reading system before and after. Results indicate a statistically significant effect for use the online collaborative annotation reading system ($p<0.020$). Subsequent univariate analysis of variance (illustrated in Table 2 in the Appendix) revealed that, across all survey items evaluating collaborative annotation, the statistically significant effects on the annotation system including "I would like to read annotations made by my team members," "group annotation sharing scenario improve my motivation," "I would like to read annotations made by others," "full annotation-sharing improve my motivation in learning," and "to read and use the Web-based materials of the system." After using the online collaborative annotation reading system, students reported higher scores in all survey items. In particular, the highest increase item is "I would like to read annotations made by others." Results are presented graphically in Figure 3 below.

Figure 3. The Scores on Collaborative Annotation from the Pre-and Post-Survey

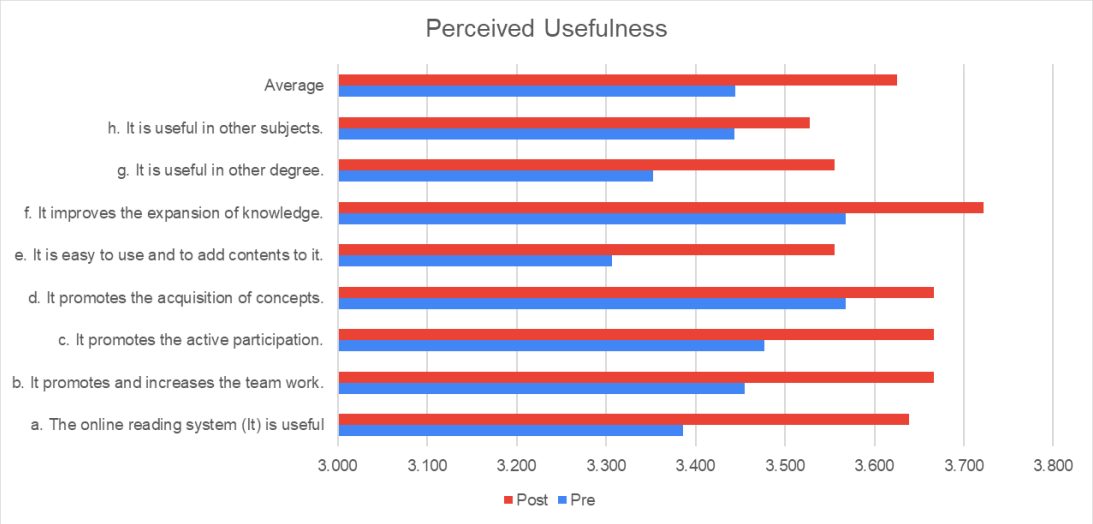



*Perceived usefulness*

Results indicate a statistically significant effect for the perceived usefulness of the online collaborative annotation reading system ($p<0.017$). Subsequent univariate analysis of variance (illustrated in Table 2 in the Appendix) revealed that, across all

survey items evaluating collaborative annotation, the statistically significant effects on the annotation system including the online reading system is useful, increases the team work, promotes the active participation, promotes the acquisition of concepts, is easy to use and to add contents to it, improves the expansion of knowledge, and is useful in other degree. After using the online collaborative annotation reading system, students reported higher scores in all survey items, but one. Results are presented graphically in Figure 4.

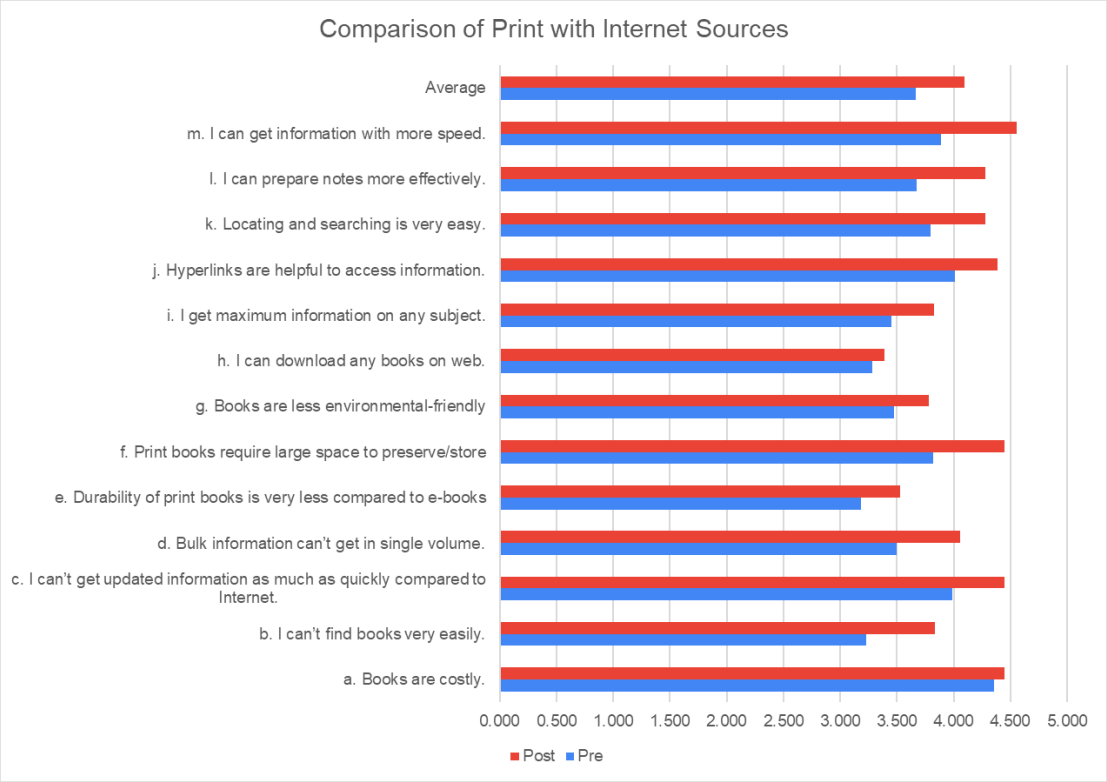
Figure 4. The Scores on Perceived Usefulness from the Pre-and Post-Survey




*Comparison of print with internet sources, and basic information*

Results didn't indicate a statistically significant effect for comparing of print with the online collaborative annotation reading system ($p<0.206$). Subsequent univariate analysis of variance (illustrated in Table 2 in the Appendix) revealed that, across all survey items evaluating collaborative annotation, the statistically significant effects on the annotation system only including four out of thirteen, bulk information can't get in single volume, print books require large space to preserve/store, locating and searching is very easy, and I can get information with more speed. After using the online collaborative annotation reading system, students do not see internet sources better than the print ones. Results are presented graphically in Figure 5.

Figure 5. The Scores on Comparison of Print with Internet Sources from the Pre-and Post-Survey




*Content Analyses*

*Annotation Patterns*

Frequencies of annotations; content of annotation

Out of ten selected readings for the annotation system testing, 50% of the selected readings attract student annotations. Table 2 shows the frequencies of annotations of weekly reading by total students and individual students. In particular, two of the readings that attract the most annotations are Fung's Democracy Cube and Listening to the City Case Study. Both articles must be read before the class for a class case discussion. Reading that does not receive any annotations, including Behn, Kirlin, Slyke, Liu, and Emerson et al., is discussed in the class through group discussions. The initial content analysis of annotation patterns shows that the annotation's usages correspond to class activities and requirements. A higher number of annotations of the readings are associated with readings that must be read before the class for specific class activities.

Table 2: Frequencies of annotations by weekly reading (including individual counts)

| **Weekly Reading** | **Total** | **Student No.** | **Individual** |
|---|---|---|---|
| Behn | 0 | N/A | N/A |
| Kirlin | 0 | N/A | N/A |
| Slyke | 0 | N/A | N/A |
| Ferris&Graddy | 16 | Student 1 | 10 |
| | | Student 2 | 6 |
| Emerson, K., Nabatchi, T., and Balogh | 0 | N/A | N/A |
| Chu | 6 | Student 3 | 1 |
| | | Student 4 | 2 |

| | | | |
|---|---|---|---|
| | | Student 5 | 1 |
| | | Student 6 | 1 |
| | | Student 7 | 1 |
| Liu | 0 | N/A | N/A |
| Fung | 26 | Student 1 | 7 |
| | | Student 8 | 2 |
| | | Student 9 | 1 |
| | | Student 10 | 7 |
| | | Student 6 | 3 |
| | | Student 10 | 3 |
| | | Student 11 | 1 |
| | | Student 5 | 1 |
| | | Student 12 | 1 |
| Listening to the City | 18 | Student 10 | 13 |
| | | Student 8 | 13 |
| Nabatchi, T., Sancino, A., & Sicilia, M. | 1 | Student 8 | 1 |

**(2)** 教師教學反思

*Adoption of Online Collaborative Annotation Reading System for Public Administration Learning*

Building on previous studies (Chen et al., 2020; Hwang et al., 2007), we adopted an online collaborative annotation reading system for learning public administration. Through our assessment, we found mixed results. From the pre-and post-survey, the study found a significant positive impact on student's adoption of the online collaborative annotation reading system. Students expressed increased motivation to read annotations made by their peers and instructors, indicating a greater engagement with course materials. This suggests that collaborative annotation fosters a more interactive and participatory learning environment. These findings echo prior studies by Hwang et al. (2007) and Yang et al. (2013). However, when examining the actual usages of the annotation systems, only 50% of the usages based on the selected reading for the system testing.

*Improvement of Reading in Public Administration Fundamental Classes*

For learning professional knowledge like public administration, students found it beneficial for teamwork, active participation, concept acquisition, knowledge expansion, and ease of use according to the pre-and post-survey. This suggests that the system not only facilitates collaborative learning but also improves individual learning outcomes. However, no significant difference was observed in student preference for online vs. print resources, suggesting that both formats remain relevant in the learning process.

*Adoption the Annotation System for the Pre-Class Preparation Readings*

The analysis of annotation patterns through the content analysis revealed that annotation usage was strongly linked to class activities and requirements. Readings assigned for specific class activities, such as case discussions, attracted significantly more annotations. This indicates that collaborative annotation can serve as a valuable

tool for promoting active engagement with course materials and facilitating in-class discussions. Overall, the findings suggest that the online collaborative annotation system can be a valuable addition to Public Administration courses, enhancing student engagement, collaboration, and learning outcomes.

*Journal Publications*
Our team continue publishing research in local or international journals for improving public administration and nonprofit-related education. Based on a related previous project from the Public Administration course, our team has published on the following SSCI journal:

- Liu, Helen K., Zih-Yang Zhou, and Benjamin Jackson. Exploring Learning Outcomes of Wikipedia-based assignments in an International Setting: A Case from an Undergraduate Public Administration Course in Taiwan. *Journal of Political Science Education.* 2024. https://www.tandfonline.com/doi/full/10.1080/15512169.2024.2332471

We will further provide evidence on the effects of an online collaborative annotation reading system on students' reading and learning outcomes. This will contribute to public administration and related fields for students' engagement in learning fundamental knowledge.

*Workshop Presentations*
The PI attended the capacity-building workshop for MOE projects, as she has previously given three talks at the National Taiwan University and MOE.

**(3)** 學生學習回饋

Based on the open-end questions, students had mixed opinions about the Online Collaborative Annotation Reading System. Some students found it helpful and enjoyed using it, while others found it difficult to use or did not like using it. Some students suggested that the system should be made more user-friendly and offered for different devices.

*Technical Difficulties*
From the open-end questions, students found the system cumbersome and offered suggestions for improvement. For instance, a student noted, "The online reading system is basically unusable because scrolling is not smooth. Improve the smoothness of scrolling. Add a better Fullscreen mode." Additionally, some students expressed concerns about the accessibility of the annotation feature across different devices, with one student mentioning, "I could not annotate while I was on iPad which was the main device I use to read articles." To address these concerns, some students recommended enforcing annotation use to ensure wider participation and utilization of the feature.

*Improvement in English and Knowledge*
Students express that taking the course has been a valuable experience, particularly in enhancing their English reading skills and fostering their ability to discuss professional topics in English with confidence. For instance, a quote is made, “I really enjoyed this class; it was interesting to learn about government agencies and how they interact with citizens.”

## 7. 建議與省思 (Recommendations and Reflections)

*Collaboration is key, as students demonstrate increased enjoyment in reading peer comments.*
The research highlights the positive influence of collaboration. Students reported a significant rise in their motivation and enjoyment when engaging with annotations made by their peers. This underscores the value of peer interaction and knowledge exchange within the collaborative annotation platform.

*Instructor guidance plays a crucial role.*
Although not explicitly mentioned, the strong correlation between annotation activity and specific course requirements suggests the importance of instructor guidance. Clear instructions and seamless integration of the annotation system into course activities appear to be essential for driving student engagement.

*An incentive system should be considered, based on the report's findings.*
The findings support the implementation of an incentive system to promote annotation usage. The report indicates that connecting annotations to class activities such as discussions can increase participation. An incentive system could further reward active annotators, cultivating a more dynamic and interactive learning environment.

## 二、參考文獻 (References)


Baron, N. 2021. Medium matters for reading: What we know about learning with print and digital screens. A report for K-12 Educators.
https://www.snexplores.org/article/learn-comprehension-reading-digital-screen-paper
Baron, N. 2021. How We Read Now: Strategic choices for print, screen, and audio. Oxford University Press, 304 pp.
Chen, C. M., Li, M. C., & Chen, T. C. (2020). A web-based collaborative reading annotation system with gamification mechanisms to improve reading performance. Computers & Education, 144, 103697.
Cynthia S. Deale & Seung Hyun (Jenna) Lee (2022) To Read or Not to Read? Exploring the Reading Habits of Hospitality Management Students, Journal of Hospitality & Tourism Education, 34:1, 45-56.
Fontaine G, Zagury-Orly I, Maheu-Cadotte MA, Lapierre A, Thibodeau-Jarry N, Denus S, Lordkipanidzé M, Dupont P, Lavoie P. A Meta-Analysis of the Effect of Paper Versus Digital Reading on Reading Comprehension in Health Professional Education. Am J Pharm Educ. 2021 Nov;85(10):8525. doi: 10.5688/ajpe8525. Epub 2021 Jul 22. PMID: 34301544; PMCID: PMC8715975.
Herold, B. (2014, May 6). Digital reading poses learning challenges for students.
http://www.edweek.org/ew/articles/2014/05/07/30reading_ep.h33.html?cmp=ptnr-hp
Hobson, E.H. (2004). Getting Students to Read: Fourteen Tips. Idea Paper 40. The Idea Center.
http://www.theideacenter.org/sites/default/files/Idea_Paper_40.pdf
Huang, L.S. (2019, March 15). Three Ways to Promote Student Ownership of Reading Assignments. Retrieved from https://www.facultyfocus.com/articles/effective-teaching-strategies/ three-ways-to-promote-student-ownership-of-reading-assignments/
Hwang, W. Y., Wang, C. Y., & Sharples, M. (2007). A study of multimedia annotation of Web-based materials. Computers & Education, 48(4), 680-699.
Jabr, F. (2013, April 11). The reading brain in the digital age: The science of paper versus screens. *Scientific American*. https://www.scientificamerican.com/article/reading-paper-screens/
Khongtim, J. (2021). Trends in Reading Habits of Students from School Level to Higher Levels of Education: Evidence from the Review of Literature. *Library Philosophy and Practice.*
Kim, Sung-Ju, Liu, Helen K., Jeong, Bok Gyo, and Cai, Qihai, Exploring Hong Kong Nonprofit Education Programs, *Journal of Nonprofit Education and Leadership.* 2022. DOI: https://doi.org/10.18666/JNEL-2021-11335
Kilonzo, Susan M., Sandfort, Jodi R. and Liu, Helen K. "Using Multimedia Learning Objects in Public Affairs Classrooms: Global Experiences with Hubert Project E-Cases and E-Studies." *Journal of Public Affairs Education* 2016. 22(3): 345–362.
Kumara, B., & Kumar, B. S. (2018). Impact of ICT on reading habits of students: A survey. *Asian Journal of Information Science and Technology*, 8(1), 75-79.
Lei, S. A., Bartlett, K. A., Gorney, S. E., & Herschbach, T. R. (2010). Resistance to reading compliance among college students: Instructors' perspectives. College Student Journal, 44(2), 209.
Lim, F.V., Toh, W. (2020). How to teach digital reading? *Journal of Information Literacy*, 14(2).
Liu, Helen K., Assessment of Glocalization Teaching, *Journal of Scholarship of Teaching and Learning* (Accepted, in Chinese)
Liu, Helen K., Nonprofit Management Education in Taiwan, *Journal of Nonprofit Education and Leadership.* 2022. DOI: https://doi.org/10.18666/JNEL-11432
Liu, Helen K. and Liu, Yusheng, An Exploratory Research on Nonprofit Curricula in Taiwan: A Nationwide Analysis, *Third-Sector Review*. 2021.
Male, H. et al. (2021). A Study of Students Online Reading Habits and Preferences. A.S.B.L Degres.
Mueller, P. A., & Oppenheimer, D. M. (2014). The Pen Is Mightier Than the Keyboard: Advantages of Longhand Over Laptop Note Taking. Psychological Science, 25(6), 1159–1168.
https://doi.org/10.1177/0956797614524581
Nordquist, B. (2017). Literacy and mobility: Complexity, uncertainty, and agency at the nexus of high school and college. Routledge.
Onyeje, B. T., Nwankwo, C. U., Nnama, T. N., & Ogoke, O. J. (2022). The Influence of Internet Use on the Reading Habit of Undergraduate Nursing Students in College of Nursing Sciences, Amichi, Anambra State.
Rizqy, M. H. (2022). ANALYSIS OF STUDENTS'READING HABIT TOWARDS ACADEMIC TEXT. Jurnal Penelitian, Pendidikan, dan Pembelajaran, 17(11).
Ryan, T. E. (2009, November 13). Why it's so hard to get students to read the textbook, and what happens when they do. Retrieved from http://www.facultyfocus.com/articles/teaching-and-learning/why-its-so-hard-to-get-students-to-read-the-textbook-and-what-happens-when-they- do/

Singer, L. M., & Alexander, P. A. (2017). Reading on Paper and Digitally: What the Past Decades of Empirical Research Reveal. *Review of Educational Research*, 87(6), 1007–1041. https://doi.org/10.3102/0034654317722961
Tajuddin, E. And Mohamed, F. S. (2019). 'Paper Versus Screen: Impact on Reading Comprehension and Speed', Indonesian Journal of Education Methods Development, 3(2), 1-22.
Wongkietkachorn, Apinut & Prakoonsuksapan, Jetbodin & Wangsaturaka, Danai. (2014). What happens when teachers do not give students handouts?. Medical teacher. 36. 1-5. 10.3109/0142159X.2014.909921.
Yang, X., Yu, S., & Sun, Z. (2013). The effect of collaborative annotation on Chinese reading level in primary schools in China. British Journal of Educational Technology, 44(1), 95-111.

# 三、附件 (Appendix)

（1） 附件 (**Appendix I**)

A. Reading Habits
a. Please indicate the weekly reading hours for this class? ____Hours
b. Please indicate the weekly reading hours outside this class? ____Hours
c. Please indicate the weekly hours of internet usages (including social media)? ____Hours

B. Reading Abilities
(Strongly Agree/ Agree/ Neutral/Disagree/ Strongly Disagree)
a. I would like to spend time reading.
b. I like the appearance and style of the reading interface through NTU COOL.
c. I like to read because it is novel and interesting through the NTU COOL.
d. Generally, I can handle the reading as peer interaction helps me resolve my questions.

C. Purpose of Reading
(Strongly Agree/ Agree/ Neutral/Disagree/ Strongly Disagree)
a. To prepare for exam.
b. To prepare class notes.
c. It is my hobby.
d. To learn new words.
e. To get ahead in my studies.

D. Collaborative Annotation Evaluation
(Same as Above)
a. In group annotation sharing scenario, I would like to read annotations made by my team members.
b. I think that the arrangement of group annotation sharing scenario did improve my motivation in learning.
c. In full annotation-sharing scenario, I would like to read annotations made by others.
d. I think that the arrangement of "full annotation-sharing" scenario did improve my motivation in learning.
e. Due to the annotation mechanism, I was facilitated to read the Web-based materials and to use the functionalities of the system.

E. Perceived Usefulness
(Same as Above)
a. The online reading system (It) is useful.
b. It promotes and increases the team work.
c. It promotes the active participation.
d. It promotes the acquisition of concepts.
e. It is easy to use and to add contents to it.
f. It improves the expansion of knowledge.
g. It is useful in other degree.
h. It is useful in other subjects.

F. Comparison of Print with Internet Sources
(Same as Above)
a. Books are costly.
b. I can't find books very easily.
c. I can't get updated information as much as quickly compared to Internet.
d. Bulk information can't get in single volume.
e. Durability of print books is very less compared to e-books
f. Print books require large space to preserve/store
g. Books are less environmental-friendly
h. I can download any books on web.
i. I get maximum information on any subject.
j. Hyperlinks are helpful to access information.
k. Locating and searching is very easy.
l. I can prepare notes more effectively.
m. I can get information with more speed.

G. Basic Information (omitted here)

In this section, tell us what improvements we can make?

附件 **(Appendix II)**

Table 1 Individual Characteristics

| **Variables** | **Number of Participants in the Pre-Test** | **Number of Participants in the Post-Test** |
|---|---|---|
| Gender | | |
| Male | 22 | 5 |
| Female | 21 | 13 |
| Prefer not to say | 1 | 0 |
| Grade | | |
| Freshman | 10 | 2 |
| Sophomore | 11 | 9 |
| Junior | 14 | 6 |
| Senior or above | 9 | 1 |
| International / Local | | |
| International Students | 26 | 16 |
| Local Students | 18 | 2 |
| Weekly Reading Hours for This Class | | |
| <2 Hours | 16 | 8 |
| 2-5 Hours | 25 | 9 |
| 6-10 Hours | 2 | 1 |
| Above 10 Hours | 1 | 0 |
| Weekly Reading Hours Outside This Class | | |
| <2 Hours | 5 | 3 |
| 2-5 Hours | 14 | 6 |
| 6-10 Hours | 13 | 7 |
| Above 10 Hours | 12 | 2 |
| Weekly Hours of Internet Usages | | |
| <2 Hours | 1 | 0 |
| 2-5 Hours | 5 | 3 |
| 6-10 Hours | 11 | 6 |
| Above 10 Hours | 27 | 9 |
| Total | 44 | 18 |

附件 **(Appendix III)**

Table 2 The differences of the pre and post survey results, with Fisher's exact p-value.

| 問 題 敘 述 | 前後測 | 90%信賴區間 | | p-value |
|---|---|---|---|---|
| | 成長幅度 | 下界 | 上界 | |
| **D. Collaborative Annotation Evaluation** | | | | |
| a. I would like to read annotations made by my team members. | 0.4040* | 3.2860 | 3.5941 | 0.095 |
| b. group annotation sharing scenario improve my motivation | 0.3068*** | 3.1326 | 3.4388 | 0.004 |
| c. I would like to read annotations made by others. | 0.4596** | 3.3067 | 3.6058 | 0.016 |
| d. full annotation-sharing improve my motivation in learning. | 0.3030*** | 3.0659 | 3.3427 | 0.005 |
| e. to read and use the Web-based materials of the system. | 0.2626* | 3.1119 | 3.4107 | 0.090 |
| Average | 0.3472** | 3.2052 | 3.4534 | 0.020 |
| **E. Perceived Usefulness** | | | | |
| a. The online reading system (It) is useful | 0.2525** | 3.2923 | 3.6369 | 0.019 |
| b. It promotes and increases the team work. | 0.2121** | 3.3568 | 3.6859 | 0.007 |
| c. It promotes the active participation. | 0.1894*** | 3.3686 | 3.7067 | 0.001 |
| d. It promotes the acquisition of concepts. | 0.0985* | 3.4480 | 3.7569 | 0.035 |
| e. It is easy to use and to add contents to it. | 0.2487* | 3.1874 | 3.5798 | 0.030 |
| f. It improves the expansion of knowledge. | 0.1540*** | 3.4553 | 3.7823 | 0.002 |
| g. It is useful in other degree. | 0.2033** | 3.2809 | 3.5501 | 0.047 |
| h. It is useful in other subjects. | 0.0846 | 3.3315 | 3.6133 | 0.238 |
| Average | 0.1804** | 3.3673 | 3.6363 | 0.017 |
| **F. Comparison of Print with Internet Sources** | | | | |
| a. Books are costly. | 0.0922 | 4.2444 | 4.5332 | 0.663 |
| b. I can’t find books very easily. | 0.6061 | 3.1852 | 3.6312 | 0.141 |
| c. I can’t get updated information as quickly compared to Internet. | 0.4558 | 3.9408 | 4.3198 | 0.552 |
| d. Bulk information can’t get in single volume. | 0.5556* | 3.4762 | 3.8594 | 0.063 |
| e. Durability of print books is very less compared to e-books | 0.3476 | 3.0351 | 3.5309 | 0.323 |
| f. Print books require large space to preserve/store | 0.6263* | 3.8034 | 4.2143 | 0.058 |
| g. Books are less environmental-friendly | 0.3005 | 3.3807 | 3.7600 | 0.542 |
| h. I can download any books on web. | 0.1048 | 3.0781 | 3.5598 | 0.444 |
| i. I get maximum information on any subject. | 0.3690 | 3.3749 | 3.7516 | 0.237 |
| j. Hyperlinks are helpful to access information. | 0.3775 | 3.9786 | 4.2808 | 0.345 |
| k. Locating and searching is very easy. | 0.4823* | 3.7586 | 4.1288 | 0.083 |
| l. I can prepare notes more effectively. | 0.6073 | 3.6399 | 4.0696 | 0.123 |
| m. I can get information with more speed. | 0.6692* | 3.8913 | 4.2885 | 0.048 |
| Average | 0.4303 | 3.6840 | 3.9134 | 0.206 |

*p > 1, **p < .05, ***p < .01