

Information Literacy Instruction at the University of Macau: Challenges, Outcomes, and Lessons Learned

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abstract: Academic libraries in Macao, China, began to use the term “information literacy” and to offer information literacy programs approximately three years ago. At the University of Macau, information literacy is considered important to help the honors students become junior researchers. Using the Framework for Information Literacy for Higher Education as the teaching guide, the University of Macau Library offered one-time research workshops to second-year honors students in 2017 and 2018. The challenges included the variety of subjects studied by the honors students, a lack of understanding of the students’ information literacy skills prior to the workshop, and limited opportunities to examine the long-term learning impact. The workshop convinced the students of the importance of information literacy. Raising awareness of the importance of information literacy to the students and educators campus wide, offering workshops to one or two disciplines, and forming a university library team to create and implement a compulsory information literacy exam are recommended.

Introduction

Information literacy is essential for students in the twenty-first century to prepare them to be critical consumers of information and responsible citizens. In the United States and other English-speaking countries, libraries have advocated information literacy since the 1970s and formulated a significant number of information literacy standards and frameworks to guide the practice. In Macao, academic libraries officially started to use the term “information literacy” in library instruction approximately three years ago.¹ Information literacy has replaced library instruction or become one of its essential parts. Information literacy programs teach students how to search the library catalog and databases, how to use survey tools, how to use citation managers, how to cite references properly, and how to publish in an academic journal. Locating relevant academic

information is taught as the essential skill. The programs are usually one-time sessions varying from 45 minutes to 3 hours.

Founded in 1981, the University of Macau is the largest public university in Macao, China, with more than 10,000 students and over 10 institutes or schools. Over the years, it has sought to become a research university. The Honors College was established in September 2009 and provides the brightest undergraduate students with opportunities to achieve academic excellence, gain leadership skills, and foster social responsibility. Students who meet a set of academic requirements are admitted to the Honors College after they have finished the first year at the university. They are also required to fulfill additional academic expectations, including completing a research project and writing a thesis. Understanding the importance of information literacy to the honors students, in 2017 and 2018 the Honors College proposed that the university library hold two information literacy programs for the students at the beginning of the academic year: a library orientation for the first-year honors students and a library research skills workshop for the second-year honors students. Both programs were one-time instruction sessions. The outcomes of the workshop were evaluated each year.

Research Questions

Due to the special academic requirements for honors students, the information literacy programs were carefully designed and delivered to meet their learning and research needs. However, there were challenges. First, prior to the workshop, the library staff had little or no knowledge of the students' levels of information literacy and their information needs. How could the one-time session achieve the best outcome? Second, because the honors students majored in different disciplines, how could the same workshop meet their different disciplinary information needs? Third, the University of Macau is an internationally diverse university, and the honors students come from Macao, mainland China, and other countries and regions. How could the same workshop meet the needs of students with different learning styles and cultural backgrounds? The research questions were thus as follows: (1) How could a one-time information literacy workshop best meet the needs of the honors students? (2) How could the information literacy instruction fulfill the needs of diverse disciplines for student attendees who pursued various majors? (3) How should information literacy be taught to students with different learning styles and cultural backgrounds?

Literature Review

As a special segment of the undergraduate student population, honors students have certain shared characteristics. They are usually highly motivated, hold themselves accountable to higher standards, and have more opportunities to grow academically. On the other hand, they must meet higher academic demands and are often required to finish additional tasks, such as completing interdisciplinary projects and composing culminating theses. Like the general student population, they struggle with using library resources, do not fully understand what constitutes information searching skills and strategies, and even have difficulty understanding the power of subscription databases and advanced



searching.² A study conducted at the Louisiana Tech University in Ruston indicates that honors students seem to have better information skills when entering the university. They significantly outpace non-honors students in finding relevant and useful information. However, they still have problems with “critically evaluating specific information and using that information to communicate effectively to a target audience” and “weeding out irrelevant information,” and thus lack essential information competence.³ An assessment indicated that 40 percent of undergraduate honors students do not know how to use library resources to locate scholarly literature, but instead rely heavily on Google. Gaps, misperceptions, and bottlenecks reduce information literacy outcomes.⁴ Therefore, library instruction remains a vital need for honors students in the twenty-first century.⁵

Solutions have been offered. To help honors students overcome “library anxiety” and teach them information skills, the Purdue University Libraries in West Lafayette, Indiana, provided research workshops for freshmen honors students in the College of Liberal Arts and partnered with the undergraduate honors programs in the 2006–2007 academic year.⁶ To effectively develop honors chemistry students’ research skills, the Auraria Library of the University of Colorado Denver delivered subject-specific library instruction in line with student assignments. The library also taught the students how to use the sophisticated scientific database SciFinder to locate scientific literature and complete a complex chemical project.⁷ A research portfolio was used to assist the honors students with their thesis research and recommended as “a vehicle for evaluating any major research process at the undergraduate and/or graduate research level.”⁸

It is important to teach honors students advanced search skills because such strategies make a difference in student learning. Advanced search strategies are associated with better grades in all fields of study⁹ and benefit, in particular, students in the natural sciences.¹⁰ Technologies are used to impart information literacy skills to honors students. Web 2.0 tools, such as a course wiki and an online citation manager, are used to teach information literacy to honors students to address their information needs, strengthen their online research skills, and enhance their writing and collaboration skills.¹¹

Library partnership is essential to offer successful information literacy education to undergraduate honors students. The Ekstrom Library at the University of Louisville in Louisville, Kentucky, had a continuing 15-year collaboration with the university’s Honors Program. The Reference Department, the Special Collections/Rare Books Department, and the University Archives were involved in the honors library orientation. The partnership created a win-win situation that benefited the library, the honors program, and the students, and reflected the evolution of the information literacy program in general.¹² Some libraries used special and ongoing outreach to the honors program to enhance honors students’ information literacy skills through library instruction. At Oakland University in Rochester, Michigan, the liaison librarian to the Honors College successfully combined her outreach duties with information consulting services.¹³

Information literacy programs for honors students need to consider that cultural factors and different learning skills play a role in learning. Honors students may come

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from different cultural backgrounds. The University of the South Pacific in Suva, Fiji, implemented an information literacy program to reflect the educational priorities of the institution and the region. Considering that sociocultural contexts played a role in information literacy education, the university developed a framework based on international standards and as well as the cultural aspects of the students' learning environment to perform effective information literacy education.¹⁴ However, few researchers have explored how information literacy instruction is conducted in universities and colleges

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in non-English speaking countries. Cultural differences generate significantly different teaching approaches and learning styles. In addition, there are few multilingual information literacy models that students from non-English speaking environments can use.¹⁵

International students from a variety of educational and cultural backgrounds face unique challenges in conducting successful academic research in the United States and can benefit from library research support, especially through information literacy instruction and outreach. For this reason, information literacy programs should be designed to meet the needs of this population.¹⁶

Information Literacy Instruction at the University of Macau

In summer 2017, the Honors College at the University of Macau sent a request for information literacy instruction to the university library via e-mail. The staff in charge of the student activities program in the Honors College proposed that the library provide a library orientation to the first-year honors students and a research skills workshop to teach the second-year honors students how to use library resources, equipping them to complete an honors project in the next academic year. The library orientation would be offered in late September or early October and the research skills workshop in October.

Upon receiving the request, the library provided the outlines of both the library orientation and the research skills workshop. When the new semester started in mid-August the Honors College sent the outlines to all first- and second-year honors students along with an invitation to register for the sessions. Considering that the students had different levels of information literacy skills and every student might not need this particular information literacy program, the Honors College decided that both programs were not mandatory. Students who attended the research skills workshop were required to evaluate it through a survey questionnaire in print.

The workshop and orientation were both guided by the Association of College and Research Libraries (ACRL) Framework for Information Literacy for Higher Education. Table 1 shows the learning contents and learning points of the research skills workshop and the library orientation along with the ACRL's information literacy concepts imparted.



Table 1.
Curriculum contents, learning points, and information literacy concepts imparted in University of Macau workshops

Program	Curriculum contents	Learning points	Information literacy concepts imparted
Research skills workshop (90 minutes)	Information search: books, e-books, periodicals, e-journals, and free online sources	Identify and locate scholarly literature; learn and use effective search strategies; identify and locate multidisciplinary databases and subject databases	“Authority Is Constructed and Contextual”; “Information Creation as a Process”; “Scholarship as Conversation”; “Searching as Strategic Exploration”
Library orientation (60 minutes, including a 20-minute library tour)	Manage search results and citations Search features: library catalog, federated searching Library services and facilities	Identify relevant literature; academic integrity Learn the scholarly value of the library resources and how to use them Knowledge of library services and facilities	“Information Has Value”; “Research as Inquiry” “Information Has Value”; “Research as Inquiry”; “Searching as Strategic Exploration” “Information Has Value”

Meeting the Needs of Students in a Variety of Subjects

The subjects studied by the student participants varied significantly in both 2017 and 2018, which was a challenge to teaching and learning. In 2017, the workshop received 14 students in 8 subjects. The majority of the students majored in accounting (22 percent) or English studies (22 percent). The next largest groups pursued degrees in government and public administration (14 percent) and communication studies (14 percent). The rest of the students were in sociology (7 percent), psychology (7 percent), mathematics (7 percent), and biomedical sciences (7 percent). Over 85 percent of the students were in the social sciences and humanities. The variety of the students' subjects is shown in Figure 1.

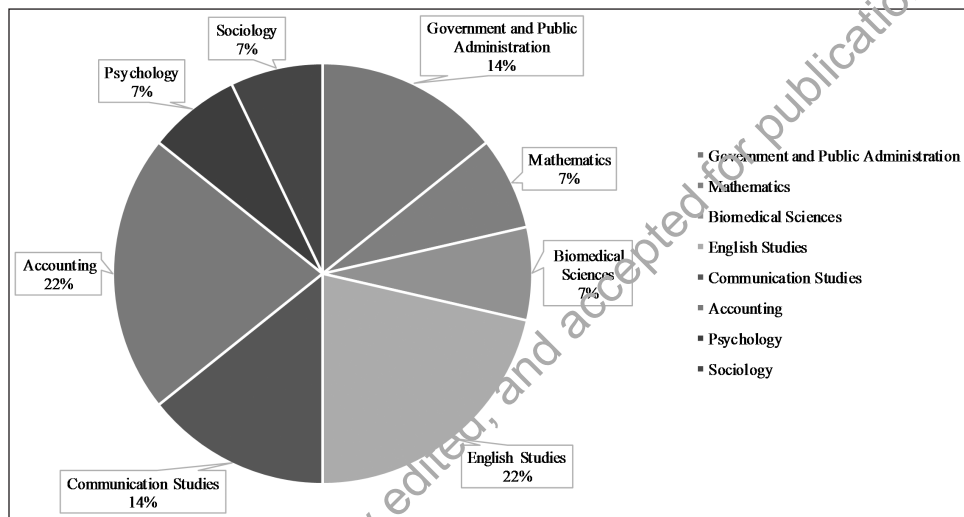


Figure 1. Subject distribution of students in 2017 University of Macau workshops.

In 2018, the 21 student participants were in 10 majors in the social sciences and humanities. They pursued degrees in accounting (24 percent), finance (14 percent), education (14 percent), psychology (10 percent), Portuguese studies (9 percent), English studies (9 percent), communication (5 percent), international relations (5 percent), global business management (5 percent), and hospitality and gaming management (5 percent). Unlike 2017, the student attendees all majored in the humanities or the social sciences, as indicated in Figure 2.

It is important to situate information literacy in the disciplines so that students can develop discipline-specific information skills and behaviors.¹⁷ In this study, the honors students needed the relevant skills to complete research-oriented projects related to their majors. How the same research skills workshop could help students in different majors complete their research assignments was a challenge. The challenge was greater because data regarding the information literacy skills of the participants were not available before the session. The solution the library adopted was to teach a combination of

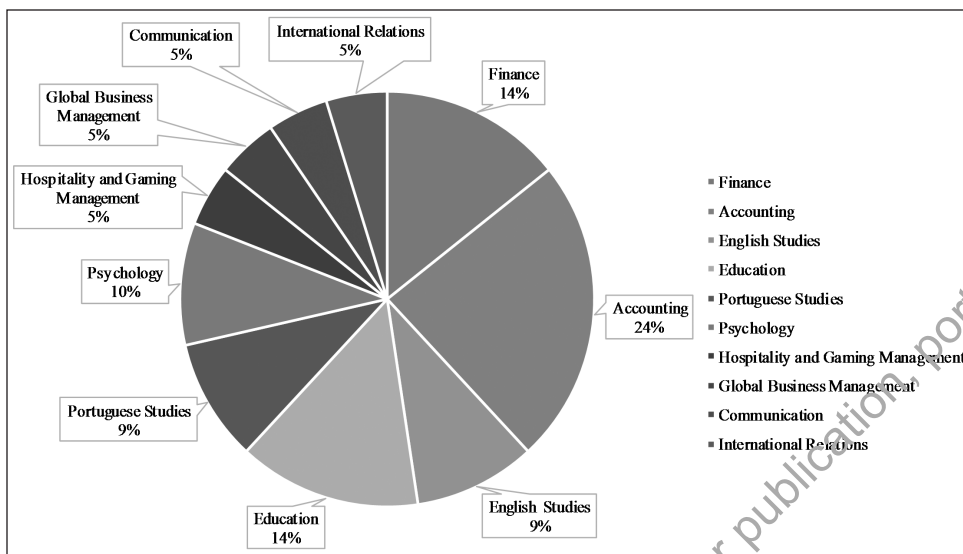


Figure 2. Subject distribution of students in 2018 University of Macau workshops.

generic information skills and subject-specific skills. The Honors College finalized the participant lists approximately 10 days before the session. After receiving the list, the library would examine the students' majors and carefully prepare examples to use in teaching, including the types of information to search for, such as books, journal articles, and data, and the types of resources to demonstrate, such as subject-specific databases and multidisciplinary databases. Therefore, besides the generic information literacy skills (academic integrity and use of federated searching, Boolean operators, citation management tools, and the like), each student learned how to search disciplinary sources.

The "drawing analogies" method is a commonly used learning method in China. This learning theory originated from Confucian teachings. In the *Analects*, Confucius said, "I do not open up the truth to one who is not eager to get knowledge, nor help out any one who is not anxious to explain himself. When I have presented one corner of a subject to any one, and he cannot from it learn the other three, I do not repeat my lesson."¹⁸ Students should be able to draw inferences and expand upon what they have learned. This theory influences Chinese pedagogy from kindergarten to college. Drawing analogies is considered an essential skill that the school should teach and students should acquire. It is a learning strategy which can be applied in a variety of subjects, and its principle is highly consistent with modern educational psychology.¹⁹

Workshop instructors employed the analogies method to address the challenge posed by the variety of the attendees' subjects. The workshop essentially demonstrated how

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to use the federated search method to find multiple information resources with a single query. The instructors explained to the students that the databases looked different and fulfilled different research purposes, but the searching techniques were similar. When the workshop used this method, it increased greatly the students' confidence in using different databases. The databases demonstrated in the three sessions included Emerald Insight, CEIC for economic data, MLA (Modern Language Association) International Bibliography, ERIC (Education Resources Information Center), PubMed for medicine and life sciences, Hospitality & Tourism Complete, ScienceDirect, PsycINFO, and Web of Science. As the honors students needed to complete interdisciplinary research projects, it was essential for them to learn to use databases outside their fields of study. Throughout the session, the librarian assigned interactive exercises to the students, verified their answers, commented on their performances, and observed their reactions.

Assessment Methodology

The library held the library orientation for the first-year honors students and two sessions of the research skills workshop for the second-year honors students in 2017. At the end of each workshop session, a student representative handed out an anonymous survey to the attendees and required all of them to complete it. Designed and created by the Honors College, the survey was used to evaluate all the workshops provided to honors students, whether offered by the college independently or in collaboration with other units on campus. The student representative collected all the evaluations and submitted them to the Honors College. After two weeks, the Honors College sent copies of the original evaluations along with a preliminary analysis of the data to the library. At the workshops, the librarian assessed the learning outcomes through such methods as questions, in-class exercises, and observation.

The survey was divided into seven parts with a total of 19 questions, covering the training objectives, the contents of the workshop, the performance of the trainer, other

Multiple assessment methods, such as student surveys, homework assignments, exam questions, pretests and posttests, and research projects, allow the librarian to adjust the teaching methods, modify the contents, and improve the learning outcomes.

arrangements of the workshop (such as the venue, date, time, equipment, and session duration), the overall evaluation of the workshop, recommendations for future sessions, and other suggestions. The rating scale was as follows: 1 = poor, 2 = fair, 3 = good, 4 = very good, and 5 = excellent. At the request of the Honors College, the library offered the same programs to the honors students

in 2018, and the same survey questionnaire was distributed to the attendees to evaluate the outcome of the workshop.

In 2017, a total of 14 students attended the research skills workshop. In 2018, two sessions were offered. The first session drew 9 students and the second 12 students. All the students in both years completed the survey questionnaire, as required by the Honors College.



The assessment of information literacy programs is important for three fundamental purposes: (1) to increase student learning, (2) to respond to calls for accountability, and (3) to improve library instruction programs.²⁰ Multiple assessment methods, such as student surveys, homework assignments, exam questions, pretests and posttests, and research projects, allow the librarian to adjust the teaching methods, modify the contents, and improve the learning outcomes.²¹ The assessment of the student learning experience has shifted from “using tool based test type assessments, to a more holistic and integrated attempt to understand how students think about research.”²²

Outcomes

In this study, the assessment took the form of anonymous survey conducted by the Honors College. The library learned how the workshop would be assessed only after receiving the students’ feedback on the 2017 workshop. In 2018, the library could refer to the evaluation criteria to improve the workshop. One hundred percent of the student attendees in 2017 and 2018 said that they would recommend this workshop to other students. In 2017, only one student reported that the workshop had partly achieved the learning objectives. The other student participants in 2017 and all the participants in 2018 said the workshop had fully achieved the learning objectives. No one declared that the workshop had failed to achieve the objectives.

Among the evaluation criteria, the Honors College paid close attention to the following three outcomes: (1) the students’ overall satisfaction of the contents delivered, (2) the overall performance of the librarian, and (3) the students’ overall evaluation of the workshop. The average scores of these three evaluations in both 2017 and 2018 were more than 4 points out of 5, that is, between “very good” and “excellent.” The contents delivered and the overall evaluation of the workshop improved in 2018, and for the second session in 2018, the students’ overall satisfaction with the contents delivered and the overall evaluation of the librarian’s performance reached an average score of 4.8 points out of 5, as shown in Figure 3.

In 2018, the Honors College particularly examined the students’ feedback on the venue of the workshop. Providing instruction in a suitable user-friendly venue is one of the fundamentals of library instruction.²³ The workshop was held in the instruction room of the library. Two screens projected the teaching contents, the library provided laptops to the students, and the desks and chairs were movable. The library wanted to ensure that its venue supported the teaching quality and indirectly promoted the library service. The average score of the students’ evaluations of the venue was 4.5 out of 5, indicating that the students were satisfied with it. Overall, the comments written on the surveys gave favorable feedback, such as “in general, it is very good,” “happy to have the workshop,” “please share the references or guidelines with us after the class,” and “the instructor’s explanations are very clear.”

Lessons Learned

Librarians are often asked to deliver 50- to 90-minute one-time library instruction sessions. However, the effectiveness of the learning outcome is limited because instruction librarians are often overwhelmed. Credit courses and multiple information literacy sessions are thus recommended to overcome this shortcoming.²⁴

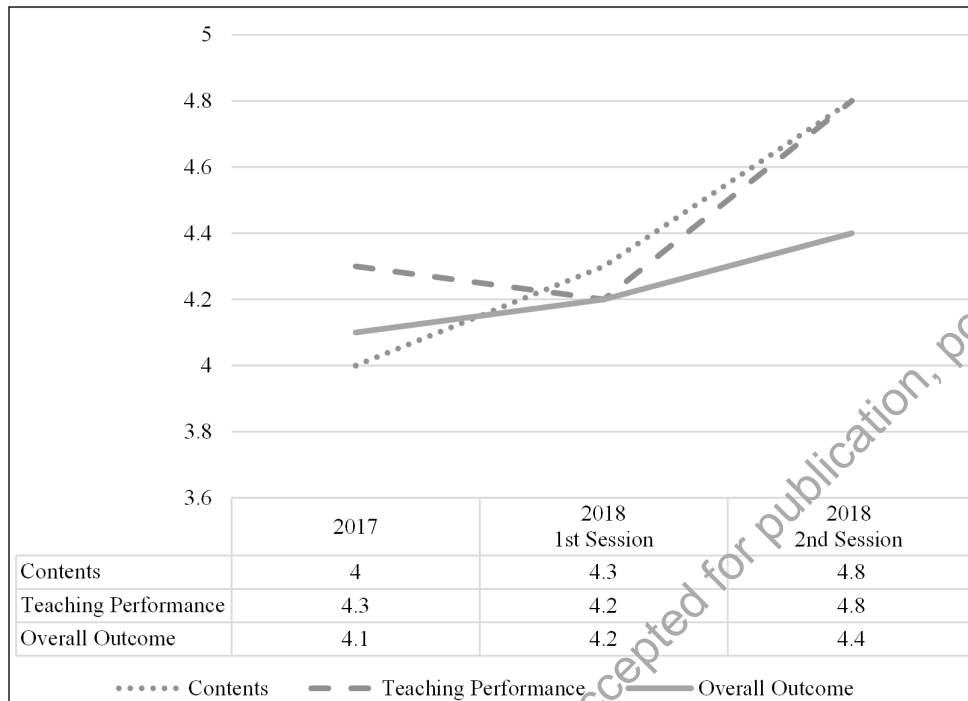


Figure 3. Participants' evaluation of teaching outcomes in University of Macau workshops.

In this study, the 90-minute, one-time session worked well for the honors students. Both generic and subject-specific information skills were introduced, the students learned the essential skills of locating relevant information using search techniques and critical thinking, and they built a good foundation for their research skills. The workshop also did a quick introduction to the use of EndNote and Qualtrics, and informed the students that they could further schedule a customized session for these two tools. The average score for the duration of the workshop from the students marked was 4.1 out of 5 in 2017, and 4.5 out of 5 in 2018.

The workshop was not mandatory, but universities should consider requiring students to attend. In fact, making library instruction mandatory is important because required attendance "provides a formal mechanism for exposure to the library and its resources, enhances the ability of a student to succeed in coursework, tends to foster self-reliance in using library resources, and assists students in developing computer skills."²⁵ In this study, only a small percentage of the students attended and benefited from the workshop. It will be a good strategy in the future to make it a mandatory information literacy program and provide students with incentives to attend the workshop.

The interaction between the library and the Honors College can be increased in the future. It is encouraging that the Honors College entrusted the library with designing and delivering the workshops, but more could be done to facilitate communication between the two departments. The following recommendations are thus offered: (1) The Honors College should provide the contents and requirements of the honors research



projects to the library prior to the workshop so that the library better knows the students' information needs. (2) The Honors College and the library should establish a regular collaboration on how to provide the honors students with information assistance. (3) The Honors College should give the library information on the students with special information needs. (4) The library should assign specific subject librarians to teach information literacy in the disciplines.

As a former colony of Portugal, Macao is highly internationalized, and so is the University of Macau. The honors students come from Macao, mainland China, and other countries. Among the students who attended the workshop, most of them were locals, but several came from mainland China and South Asia. In delivering information literacy instruction, students' different cultural and social backgrounds as well as their different learning styles should be taken into consideration.²⁶ In this study, the workshop was conducted in simple English to ensure that every student understood the lecture. The interactive exercises and group activities were used in class with students from different geographical places divided into groups and working together. A lecture with slides in addition to the demonstration turned out to be an effective teaching method. The participants' comments indicated that the instructor's explanations were very clear and the teaching method was effective.

In summer 2019, the library did a follow-up with the students who attended the workshops in 2017 and 2018 regarding the long-term impact of the workshops on their learning. The students provided positive feedback, as shown in Table 2, indicating that the research skills workshop was effective and favorably impacted the students' learning at the Honors College and their future study at the graduate school.

Conclusion

Information literacy education is emerging in academic libraries in Macao. In this study, the library at the University of Macau relied on the ACRL Framework for Information Literacy for Higher Education as the guide to deliver research skills to honors students. The information literacy concepts were conveyed through a lecture, demonstrations, and in-class exercises. The method of "drawing analogies" was used to address the challenge brought by the variety of the student attendees' subjects. The lecture assisted with slides was the essential teaching method and was effective, according to feedback from the students.

In the future, specific subject librarians will be assigned to teach information literacy in the disciplines. The workshop will be presented as a mandatory learning opportunity to benefit more students. It is essential to promote information literacy to students not only as important research skills but also as lifelong learning skills. It is important to strengthen the library-honors partnership. Raising awareness of the importance of information literacy to learners and educators campus wide, offering workshops to

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Table 2.
Questions on follow-up survey of students in summer 2019

Questions	Answers
Has the research workshop increased your confidence in using library resources to finish your academic projects?	The research workshop has significantly increased my confidence in using the library resources to finish my academic projects. In particular, I learned how to access different database to search for relevant journal articles for the literature reviews and discussions.
Has the research workshop increased your persistence in finding good information needed by your assignment?	The research workshop has increased my persistence in finding good information needed by my assignment. Especially, I learned how to use the filters (e.g., “and” or “or” to get more or fewer results) and features on Google Scholar to obtain useful information for my research topic.
Is the research workshop helpful in improving your academic performance?	The research workshop is helpful in improving my academic performance. I understand how to use appropriate searching techniques and strategies to enhance the efficiency and effectiveness.
Do you have other feedback regarding the research workshop?	The techniques taught at the workshop were truly meaningful to my thesis project at the university. The advice transferred meant a lot to me, in particular, for the research project I am conducting now as a graduate student at a U.K. university. I cannot agree more that undergraduate students should read as many journal articles as they can.

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one or two disciplines, and forming a university library team to create and implement a compulsory information literacy exam are also recommended.

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Notes

1. The spellings "Macao" and "Macau" are both correct. In this article the author uses "Macao" to refer to the city because after its return to China, the State Council in Beijing decreed that Macao in English should be spelt with an "o" and official names, such as the University of Macau, should continue to use their original spelling.
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