Wang (*Learning Support Services Manager*) University of Auckland [Auckland, NZ] and *Weiner* (*Professor and W. Wayne Booker Chair in Information Literacy*) Purdue University [West Lafayette, IN]

Preparing Librarians to be Campus Leaders by Curriculum Mapping and Curriculum Integration of Information Literacy

Li Wang and Sharon A. Weiner

Introduction

Integration of information literacy into the higher education curriculum is highly desirable, but it is has been a long-standing challenge (Weiner, 2012, p. 288). "The fact that information literacy is applicable in all disciplines, involves metacognition, and is a way of thinking combined with a set of skills, hampers its inclusion in a methodical way in college curricula. It doesn't 'belong' to any single discipline, but instead belongs to all of them" (Weiner, 2010). Because librarians work with faculty in all of the disciplines, they are in an optimal position to be campus leaders in integrating information literacy into curricula. This paper provides a foundation for librarians to gain expertise and play a leadership role in information literacy (IL) education. This knowledge prepares librarians for campus leadership, since the curriculum is the primary focus of teaching and learning and affects the entire campus. This approach involves curriculum mapping for the purpose of curriculum integration of information literacy. It demonstrates how to analyze the *offered* curriculum; how to map it against the *intended* curriculum; and how to integrate IL into the offered curriculum. Two examples show how curriculum integration can occur in different universities.

At the University of Auckland, librarians led the effort with the collaboration and influence of faculty and the University Teaching and Learning Quality Committee. A research-based approach (Wang, 2010) was successfully applied in a professional development program for subject librarians at the University of Auckland. Many subject librarians have completed the program. As a result of their increased understanding they collaborated with faculty in the curriculum mapping of several academic courses offered by faculties at the University and led the associated integration of information literacy into those courses.

At Purdue University, librarians collaborated on and influenced institution-led changes to the curriculum and a course transformation initiative. They participated in training on pedagogy and technology with disciplinary faculty. The paper concludes with a discussion of the role of curriculum mapping in institutional assessment. This may result in cross institutional comparison data that should strengthen justifications for engaging in curriculum mapping and integration of information literacy.

Definitions

The curriculum in a university is an educational plan to engage students to acquire the knowledge and skills leading to a degree or certificate. It does not only refer to the official list of courses and their content, but also to the purposes, organization, delivery activities, and evaluation programs developed by the institution for the courses. The curriculum can be viewed as: the intended curriculum (the institution's expectation of what is to be taught or learned), the offered curriculum (what teachers teach or plan to teach), and the received curriculum (the knowledge and skills that are actually learned by students via the courses) (Wang, 2013).

Curriculum integration is the process of intentionally weaving IL capability into the curriculum at the points when students need to master specific competencies.

Curriculum mapping is a process by which the offered curricula are methodically examined and mapped against the intended curriculum. Curriculum mapping can identify the potential courses for information literacy (IL) capabilities to be integrated.

CURRICULUM MAPPING

Curriculum mapping identifies the gaps in IL capabilities in the offered curriculum against the intended curriculum and fills those gaps by integrating IL into the curriculum.

To map the curriculum, one needs to identify the intended curriculum at one's university. The intended curriculum could include expected attributes of graduates of the university, national or institutional teaching and learning policies and guidelines, accrediting organizations' requirements, and university endorsed information literacy standards or frameworks.

For example, at the University of Auckland, the undergraduate Graduate Profile stated that University expects its graduates to have the following attributes: "An ability to recognise when information is needed and a capacity to locate, evaluate and use this information effectively" (University of Auckland, 2003, p. 1). There is a specific university teaching and learning guideline on IL at the University. The objectives of the IL Guidelines and Principle stated the intention: "to ensure that graduates enter the workforce information literate" and "to ensure that information literacy is integrated into the academic curriculum of the University" (University of Auckland, 2011, p. 2). It is also clearly stated that "Deans of Faculties and Heads of Departments and Schools, in collaboration with the University Library, are responsible for ensuring that students in their Faculties, Departments and Schools have the opportunity to develop and use information literacy competencies in the course of learning and research" (University of Auckland, 2011, p. 3).

In addition to these University intended curricula, a professional academic curriculum such as engineering also needs to meet the capability requirements of the professional accrediting body. For example, The Institution of Professional Engineers New Zealand (IPENZ) requires the engineering graduates to "apply research and analytical skills to design activities" (IPENZ, 2009, p. 8, 2.2.2) and to include "integrated development of key contextual skills and knowledge that underpin professional practice, including appropriate communication skills for engineering activities" (IPENZ, 2009, p.8, 2.3.1). In addition, the IL standards from the ANZIIL IL Framework (Bundy, 2004) are endorsed by the University so graduates are also expected to be information literate.

According to the requirements in the intended curriculum, the offered curriculum can be analysed and mapped to the intended curriculum. Then the gaps can be identified and filled in by integrating information literacy into the curriculum.

The next two sections provide examples of mapping the offered curriculum against the intended curriculum and integrating information literacy into the curriculum, with the bottom-up (librarian-led) approach and the top-down (institution-led) approach.

LIBRARIAN-LED APPROACH AT UNIVERSITY OF AUCKLAND

The University of Auckland is a research-led university in New Zealand with around 40,000 students. To prepare librarians to be campus leaders and equip them with knowledge of curriculum, curriculum design and curriculum integration of IL, a staff development program was developed at the University of Auckland (Moselen & Wang, 2014).

The program consists of 5 modules:

- Module 1. Information literacy introduction – What is information literacy and why is it important to us?

- Module 2. Establishing relationships with faculty

- Module 3. Understanding the faculty curriculum

- Module 4. The integration of information literacy into curriculum and designing information literacy curricula

- Module 5. Information literacy assessment and evaluation overview

The program has been running for two years since the pilot in 2011. In all, 15 librarians have completed the program. As the result of training, librarian-led curriculum mapping and integration of IL has been initiated in many different disciplines at the University such as Engineering, Planning, Arts, Medical & Health Science and Science.

The training program was developed based on an IL integration model (Wang, 2010) which demonstrates the process of curriculum mapping and curriculum integration. From the model shown below in Figure 1, we can see that curriculum analysis and curriculum mapping is critical in understanding an academic curriculum and to identify potential courses in which IL capabilities can be systematically integrated into.

Figure 1: Curriculum mapping and integration model (Wang, 2010, p. 169)
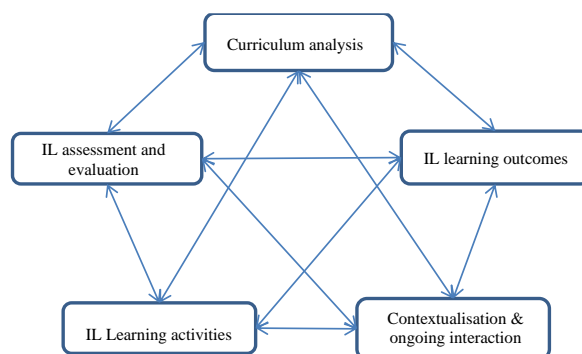
For example, in a 4-year degree program, all course information including core courses and electives from Year 1 to Year 4 can be collected from various sources. Then course

content, activities, assignments and assessment methods can be analyzed and mapped against the requirements in the intended curriculum. From the analysis, the potential courses can be identified as shown in Figure 2.

Figure 2: Mapping IL across an academic programme
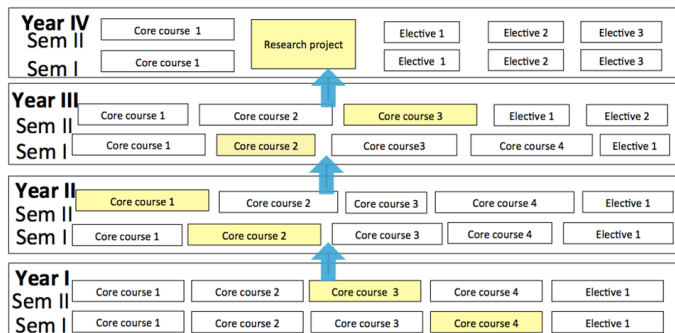
Once the potential courses are identified, the learning outcomes that describe what students are expected to gain from a course can be identified. Then IL can be integrated into curriculum planning and designing through its learning outcomes, the course activities, assignments, and assessments.

Bloom's Taxonomy of six levels of thinking (Bloom et al., 1956) is a powerful tool in curriculum integration of IL. Table 1 below gives examples of IL learning outcomes which reflect different levels of thinking when we teach the same skill, namely, constructing an effective information search strategy.

Table 1: Different learning outcomes focused on the different levels of thinking

Examples of IL learning outcomes	Levels of thinking based on Bloom's taxonomy
The students are able to list three Boolean operators.	Memory / recall
When given a research topic, the students are able to identify the search terms and write a search strategy using Boolean operators.	Comprehension
The students are able to apply a search strategy using Boolean operators to conduct searches in different databases.	Application
The students are able to analyse the search results and refine their search by using Boolean operators.	Analysis
The students are able to synthesise different search results and to evaluate search strategies and reconstructing search by using Boolean operators.	Synthesis and evaluation

From the above example we can see that, based on various learning outcomes, different levels of IL activities and assessment can be developed in an academic curriculum to foster students' different levels of thinking. We can use Blooms' Taxonomy to integrate IL into different levels of courses and therefore to build IL from a lower level to a higher level.

Table 2 provides an example of how Bloom's taxonomy, GA (Graduate Attributes), an engineering APR (Accrediting professional requirements) and the ANZIIL (Australian and New Zealand Institute of Information Literacy) can be mapped with IL learning outcomes.

For example, regarding ethical use of information, GA, APR and ANZIIL all emphasize the importance of understanding ethical and legal issues in using information. The GA stated this rationale: 'to respect for truth and for the ethics of research and scholarly activity'; the APR related this to 'the role of engineers and their responsibility to society.' The ANZIIL defines an information literate person as using information with the understanding and acknowledging of cultural, ethical, legal and social issues. These requirements demonstrate the importance of using information to learn with respect of others' work and ideas. Thus, different levels of IL learning outcomes of the ethical use of information can be identified based on Bloom's Taxonomy with respect to different levels of learning from *memory*, *understanding* and *comprehension* to *analysis*, *synthesis* and *evaluation*. Therefore, these different learning outcomes for each academic year enable students to build on their IL capability from a lower level to a higher level.

This section demonstrates the librarian-led approach to map the offered curriculum against the intended curriculum and to identify the potential courses for IL integration, and how to design learning outcomes to scaffold students in learning from junior years to senior years in higher education. This approach has influenced faculties by gaining support from heads of faculties and academic staff. It has also influenced the university Teaching and Learning Quality Committee to develop institutional guidelines on information literacy.

Table 2: Analysis of Curriculum Mapping

Graduate Attributes (GA)	Accrediting professional requirements (APR)	ANZIIL IL standards	Bloom's Taxonomy of Cognitive Processes	Examples of IL learning outcomes in Year 1	Examples of IL learning outcomes in Year 2	Examples of IL learning outcomes in Year 3	Examples of IL learning outcomes in Year 4
5(a) Respect for the ethics of research and scholarly activity. II 4. Intellectual integrity, respect for truth and for the ethics of research and scholarly activity.	2.2.2 apply research and analytical skills to design activities	1.2 Understand the purpose, scope and appropriateness of a variety of information sources; 4.1 Record information and its sources; 4.2 Organise information; 6. Use information with understanding and acknowledging cultural, ethical, economic, legal, and social issues surrounding the use of information.	**Knowledge** Remember previously-learned materials by recalling facts, terms, basic concepts and answers, e.g. recall data or information.D7 **Related terms:** define, name, memorise, list, duplicate, label, order, arrange, repeat, recognise.	• Know about library services e.g. Reference and Lending services, how to get course material, where to get help; • Be aware of the different types of literature (journal article, reference book, textbook); • Remember that the Internet does not contain everything and quality of Internet resources vary; • Know how to interpret references in course reading list or bibliographies; • Create and manage bookmarks; • Know what plagiarism is and university policies on plagiarism.	• Know how to use document delivery services; •Email/download / print/export information in a variety of formats from various sources; • Understand the www leads to some excellent resources but evaluation skills are required; • Record all pertinent citation information; • Know how to cite resources in a preferred reference style and understand that different types of literature require different forms of citation.	• Recognise other types of information in additional to books and journals; • Be able to name major reference books, academic journals and databases in their subject field of study; • View and save records in various formats; • Recognise important elements within a record and understand the significance of the citation; • Know when to give credit to information and ideas from others and how to cite resources using different reference styles.	• Know of the core journals in studied subject; • Recognise when further information is needed and be able to find it by drawing conclusions from all pertinent sources of information; • Manage information by using a citation management system; • Record all search strategies, sources used, locations of sources; • Acknowledge cultural, ethical, and socioeconomic issues related to access to, and use of information; • Understand concepts and issues relating to copyright, censorship, and intellectual freedom.

INSTITUTION-LED APPROACH AT PURDUE UNIVERSITY

Purdue University is a research and land-grant university in the Midwest United States with around 40,000 students. As is characteristic of a large, bureaucratic institution, authority to carry out responsibilities is clearly defined and the organizational structure is hierarchical. Directives and the use of processes and procedures are especially effective in this type of organization. "Established mandates…are likely to have influence. Senior administrators in the library are key people for promoting information literacy on the campus because of their position in the organizational chart" (Weiner, 2012, p. 289). Administrators and faculty in the Purdue Libraries had been involved consistently on key committees and with academic programs through liaison responsibilities when the University began an institution-wide transformational effort to improve student success. As a result, the Libraries could participate fully in developing a new intended curriculum that integrated information literacy when the Provost's office issued new directives. Two of those were particularly important for integrating IL. The first was the development of a core curriculum for Purdue; the second was an initiative to transform large introductory courses to improve student success.

The development of a core curriculum was a key priority in Purdue's 2008-2014 Strategic Plan. The learning outcomes for the "Undergraduate Outcomes-based Core Curriculum" (Purdue University Office of the Provost) were based on the American Association of Colleges & Universities LEAP outcomes. Since 2012, IL has been an expected learning outcome at both the foundational level and the embedded level. Nineteen courses, representing eight of the ten colleges at Purdue, currently qualify for addressing the foundational-level

information literacy outcome. Assessment of the foundational IL outcome occurs through the Undergraduate Curriculum Council, which evaluates nominations by course faculty using the VALUE rubric (Association of American Colleges and Universities, n.d.). All undergraduate students must meet the foundational learning outcomes. Embedded learning outcomes are included in the requirements of particular degrees or plans of study and are addressed within discipline-specific programs and majors. Assessment of the embedded IL outcome occurs at the curricular level through the program directors who will examine their curriculum and explain in a report to the University Curriculum Committee how that program addresses the outcome.

The transformation of large introductory courses is occurring through the University's IMPACT (Instruction Matters: Purdue Academic Course Transformation) program (Purdue University, 2012). The role of the faculty in the Libraries as articulated to disciplinary faculty is "to develop strategies for teaching your students how to critically engage with information to learn about course content. Specifically they will help you to develop assignments and lessons that enable students to locate, evaluate, and ethically use information in ways that are integral to the overall learning outcomes for the course" (Purdue University, 2011). In this way, IL is integrated at the course level through intensive and customized collaboration with librarians. The Libraries faculty who participate in IMPACT meet with Faculty Learning Communities to discuss instructional design with the disciplinary faculty (Levesque-Bristol, 2013, pp. 8-10). This complements professional development programs for academic librarians and prepares them well for consulting with faculty (Maybee, Doan, & Riehle, 2013, p. 3).

Through these institution-led initiatives, the offered curriculum and the intended curriculum became one, and information literacy has been integrated successfully.

CURRICULUM MAPPING AND INSTITUTIONAL ASSESSMENT

Curriculum mapping helps to determine where the addition of information literacy instruction would prepare students better for course content and instructor expectations. This contributes to learning and success at the individual student level. Curriculum mapping can be used for institution-level assessment. With an information literacy curriculum map for all programs, the strengths and gaps of information literacy capability can be identified and an objective, evidence-based assessment report can be generated. This results in a comprehensive institution-wide assessment of the degree to which IL is integrated that would be useful to program planners and internal assessment personnel, for accreditation documentation, and for comparison with other institutions.

Future work will build on what is described in this paper, Wang's research (2010), and the *Characteristics of Programs of Information Literacy that Illustrate Best Practices: A Guideline* (developed by the Association of

College and Research Libraries in 2012 at http://www.ala.org/acrl/standards/characteristics) to establish an assessment strategy or guideline in collaboration with US and New Zealand colleges and universities. This will provide faculty, librarians, and administrators with strategies in higher education for integration of information literacy into the curriculum. Related research will compare information literacy integration across institutions.

CONCLUSION

Two universities provided examples of curriculum mapping and integration. In one, the initiative was led by librarians and in the other, motivated by institutional directives. Because librarians work across institutional boundaries, they are positioned to be campus leaders in IL integration and education. With some additional training, they can analyze curricula, map offered curricula against intended curriculum, and integrate IL to improve students' information literacy capabilities.

REFERENCES

Association of American Colleges and Universities. (n.d). *VALUE: Valid Assessment of Learning in Undergraduate Education*. Washington, DC: Association of American College & Universities. Retrieved from http://www.aacu.org/value/rubrics/index_p.cfm

Bloom, B. S., Engelhart, M. D., Furst, E. J., Hill, W. H., & Krathwohl, D. R. (1956). *Taxonomy of educational objectives: The classification of educational goals: Handbook 1, Cognitive domain* (Vol. 1). New York: David McKey Company, Inc.

Bundy, A. (2004). *Australian and New Zealand information literacy framework: Principles, standards and practice*. Retrieved on Retrieved from http://www.library.unisa.edu.au/learn/infolit/infolit-2nd-edition.pdf

IPENZ, (2009). *IPENZ Requirements for Initial Academic Education for Professional Engineers*. Retrieved on April 18, 2014 from https://www.ipenz.org.nz/IPENZ/Forms/pdfs/Initial_Academic_Policy_Prof_Eng.pdf

Levesque-Bristol, C. (2013). *Annual IMPACT Report 2013: A report by the IMPACT Data Collection and Analysis Team*. Retrieved from http://docs.lib.purdue.edu/impactreps/1

Liberal Education and America's Promise (LEAP). *Essential learning outcomes.* Retrieved from https://www.aacu.org/leap/vision.cfm

Maybee, C., Doan, T., & Fraser Riehle, C. (2013). Making an IMPACT: Campus-wide collaboration for course and learning space transformation. *College & Research Libraries News, 74*(1), 32-35. Retrieved from http://crln.acrl.org/content/74/1/32.full.pdf+html

Moselen, C., & Wang, L. (2014). Integrating information literacy into academic curricula: A professional development programme for librarians at the University of Auckland. *The Journal of Academic Librarianship*, *40*(2), 116-123.

Purdue University. 2011. *IMPACT: Who we are*. Retrieved from http://www.purdue.edu/impact/whoweare.html

Purdue University. 2012. *IMPACT*. Retrieved from http://www.purdue.edu/impact/

Purdue University Office of the Provost. *Core curriculum.* Retrieved from http://www.purdue.edu/provost/initiatives/curriculum/

University of Auckland, (2003). *The University of Auckland Graduate Profiles*. Retrieved from https://www.auckland.ac.nz/en/about/teaching-learning/principles.html

University of Auckland, (2011). *Information Literacy: Guidelines and Principles*. Retrieved from https://policies.auckland.ac.nz/policy-display-register/information-literacy-guidelines-and-principles.pdf

Wang, L. (2010). *Integrating information literacy into higher education curricula- An IL curricular integration model*. (PhD thesis), Queensland University of Technology. Retrieved from http://eprints.qut.edu.au/41747/

Wang, L. (2013). Curriculum and curriculum integration of information literacy in higher education. In M. Hepworth & G. Walton (Eds.), *Developing people's information capabilities: fostering information literacy in educational, workplace and community contexts* (pp. 31-48). Bingley, UK: Emerald Group Publishing Limited.

Weiner, S. (2010). Information literacy: A neglected core competency. *EDUCAUSE Quarterly*, *33*(1). Retrieved from http://docs.lib.purdue.edu/lib_research/117/

Weiner, S. (2012). Institutionalizing information literacy. *Journal of Academic Librarianship*, *38*(5), 287–293.