Cora-Lynn Munroe-Lynds
Dalhousie University, Halifax, Nova Scotia, Canada

Information Literacy in Nova Scotia: Systematic Mapping of High School Learning Outcomes (Paper)

Abstract

Information literacy has never been more important for the functioning of the democratic process, and for autonomy over one's decisions. The Association for College and Research Libraries (ACRL) created a framework for information literacy, which lists six threshold concepts that an information literate individual possesses. This paper seeks to identify information literacy embedded in the Nova Scotia high school curriculum learning outcomes. Information literacy threshold concepts were mapped in the learning outcomes using qualitative coding. Findings from this study will reveal strengths and weaknesses in IL competencies in the Nova Scotia high school courses. This study also provides recommendation for future research.

1. Introduction

Matsubayashi & Freud (2019) conducted a study that found 86% of Canadian undergraduate students used specific sites, including social media, to find news information, and 40% of Canadian undergraduate students used search engines, like Google. When using the search engines, Canadians – young adults – often accept the first or second source that populates (Matsubayashi & Freund, 2019).

Search engines are designed to populate results based on what the algorithm determines you, as a user, will like (Bergstrom & Bak-Coleman, 2019). Because information is created by everyone and curated by algorithms based on enjoyability, social media sites are a hot spot for misinformation. As Allcott and Gentzkow (2017) contend, most fake news circulation takes place on social media news feeds. This is the case because social media sites are "systematically exploited to manipulate and alter public opinion" (Ferrara, 2017, p. 1).

The most recent case of this in Canada is the Infodemic regarding the Coronavirus pandemic. Over 80% of Canadian Facebook users admit to having been exposed to at least one form of false information about the Coronavirus since January 2020. Many scholars have suggested promoting information literacy in the public as a possible solution for combatting mis/disinformation (A. Anderson & Johnston, 2016; J. Anderson & Rainie, 2020; Austin et al., 2012; Cronin, 2010; Horn & Veermans, 2019; Kahne & Bowyer, 2017; Kupiainen et al., 2008; Lähdemäki, 2019; Nold, n.d.; O'Neill, 2010; Rubin, 2020). Odede (2020) explains that information literacy is crucial for developing "skills and abilities necessary for the rapidly changing information environment of the 2020s and beyond" (p. 15).

The purpose of this research is to systematically map the promotion of information literacy embedded in Nova Scotia high school classes and apply those findings to educational practices, education, and future research in the field of information literacy instruction in Canada. Currently, there is no research mapping information literacy in the Nova Scotia education system. To explore this topic, I seek to answer the following questions:

1. Which Nova Scotia high school courses promote information literacy, as seen in the learning outcomes for each course?
2. What aspects of the ACRL information literacy framework appear more frequently in the Nova Scotia high school learning outcomes?

2. Methods

A total of 111 course documents were collected from the Nova Scotia Department of Education and Early Childhood Development's website. There are a total of 164 courses offered between grade 10 and grade 12 in Nova Scotia. Only courses that were designed by the provincial government were included in this study. Learning outcomes from courses in 12 of the province's 16 subject areas were analyzed: arts education, business education and entrepreneurship, career education, English language arts, family studies, learning strategies, mathematics, physical education, science, skilled trades, social studies, and technology education. The breakdown of the number of documents used for the 16 subjects included in this study are as follows: arts education = 15; business education and entrepreneurship = 7; career education = 3; English language arts = 11; family studies = 7; learning strategies = 3; mathematics = 12; physical education = 6; science = 17; skilled trades = 3, social studies = 14; and technology education = 12. A breakdown of inclusion/exclusion of courses for all subjects in the Nova Scotia high school curriculum can be found in Table 1.

Table 1. Number of courses included in the study based on subject.

Subject	Total Courses	Excluded	Included in study
Mathematics	13	1	12
Science	17	0	17
English language art	11	0	11
Learning Strategies	3	0	3
Family Studies	7	0	7
Physical Education	7	1	6
Technology Education	14	2	12
Skilled Trades	5	2	3
Social Studies	17	3	14
Arts Education	15	0	15
Business Education and Entrepreneurship	8	1	7
Career Education	8	5	3
Advanced Placement	20	20	0
Gaelic language	3	3	0
International Baccalaureate	7	7	0
Core French	3	3	0
Other Languages	6	6	0
Total	**164**	**54**	**110**

Determining sufficient evidence of information literacy or learning outcomes that are related to information literacy was dependent on keywords such as “analyze,” “interpret,” “illustrate,” and display” and conditional upon whether these verbs related to evidence-based information seeking, introspective writing, thinking, listening, etc. Table 2 provides an example for each threshold concept.

Table 2. Examples of learning outcomes coded to the six ACRL information literacy threshold concepts.

Threshold Concept	***Knowledge Practice***	***Example from Curriculum***
Authority is constructed and contextual	Understanding and recognizing different types of authority and different ways of displaying authority (formally and informally); recognizing the importance of challenging authority, even of scholarly work; understanding the social dynamics and connections between and within information environments; and identifying one's voice as authoritative and understanding the impact of their	*"articulate their understanding of ways in which information texts are constructed for particular purposes" (NS English Language Arts 10-12, p. 18)*

	participation in information ecosystems *(ACRL, 2015)*	
Information creation as a process	Recognition towards information creation as a process and a responsibility; understanding one's creation as impactful. Creators of information recognize that different information needs require various information creation processes *(ACRL, 2015)*	*"articulate, advocate, and justify positions on an issue or text in a convincing manner, showing an understanding of a range of viewpoints" (NS English Language Arts 10-12, p. 26)*
Information has value	Reference to citation creation, intellectual property, copyright education, and reference to open access; understand and acknowledge the systematic racisms of marginalized peoples in information creation and dissemination; make decisions regarding where to disseminate and publish information; and continuing to advocate against issues of privacy and taking advantage of people's personal information *(ACRL, 2015)*	*"Consider social, ethical, and environmental implications of the findings from their own and others' investigations" (NS Science 10 Guide, p. 2)*
Research as inquiry	Create research questions based on current knowledge; understand how to limit the scope of the study through creating simple questions from the main research question; change research practices based on the type of research being conducted; organize, synthesize and draw meaningful conclusions based on analysis of information *(ACRL, 2015)*	*"collaboratively and individually plan, select, and use appropriate investigation methods, including fieldwork and lab experiments, to collect reliable data (qualitative and quantitative)" (NS Science 10 Guide, pg. 1)*
Scholarship as conversation	Includes all forms of communication, whether online, in person, recorded, written, spoken, etc. at the appropriate intellect level for the audience; acknowledging the work of others in one's work through proper citation; evaluation of others works and its contribution to knowledge acquisition *(ACRL, 2015)*	*"Dealing effectively with different communication situations including those addressing unfamiliar audiences" (NS English 12 Outcomes, 2019, p.112)*

Search as strategic exploration	Systematically determines the scope, identifies contributors to specific information and access their data; changing search strategy based on the tools and software presented; and use divergent and convergent thinking when retrieving information *(ACRL, 2015)*	*"select text that supports their learning needs and range of special interests" (NS English 12 Outcomes, 2019, p. 113)*

3. Results

Table 3 shows how many learning outcomes, in each subject, promotes information literacy. As you see from the figure, more than 75% show no evidence of information literacy threshold concepts. Moreover, majority of threshold concepts are promoted in less than 10% of the learning outcomes.

Table 3. Number of learning outcomes related to a threshold concept by subject.

Subject	**Percentage of LO with IL**
Mathematics	10.8%
Skilled Trade	11.1%
Career Education	14.3%
Family Studies	15.7%
Physical Education	17.1%
Technology Education	19.8%
Learning Strategies	21.7%
Business Education and Entrepreneurship	25.5%
Arts Education	25.6%
Science	28.9%
Social Studies	35.7%
English Language Arts	55.7%

Figure 1. Number of learning outcomes related to a threshold concept by subject.

Table 4 shows the number of learning outcomes, by subject, that promote the six different information literacy threshold concepts. As you can see from the figure, *research as inquiry* is the most common threshold concept. Arts Education and English Language Arts showed higher levels of *authority is constructed and contextual*, however, *research as inquiry* remain the second most promoted threshold concept among those two courses.

Table 4. Share of learning outcomes related to a threshold concept by subject.

ACRL's IL Framework Threshold Concepts	Number of LO containing THC	Percentage of LO containing THC
Authority is constructed and contextual	442	7.69%
Information creation as a process	407	7.08%
Information has value	123	2.14%
Research as inquiry	735	12.79%
Scholarship as conversation	353	6.14%
Search as strategic exploration	210	3.65%

3. Discussion

As social media becomes an increasingly important part of the way people retrieve and disseminate information, especially in younger generations, they should be given the opportunity to learn the deceptive nature of social media sites. The information literacy skills necessary for navigating today's information ecosystems should be reflected in education systems across Canada.

If anything, COVID-19 has highlighted the need for information literacy competencies. Most Canadians who interact on social media sites have seen at least one piece of fake news regarding the COVID-19 pandemic (Gruzd & Mai, 2020). Fake news challenges a government's ability to maintain trust from its citizens. People need to be able to detect falsified or sensationalized information, especially involving health related information.

Limitations

Learning outcomes in the Nova Scotia high school curriculum were often vague which made it extremely difficult to determine information literacy. Even the learning outcomes that promote information literacy often use vague terminology which requires teachers to interpret the learning outcome with the information literacy framework in mind.

4. Conclusion

The absence of information literacy elements in the course learning outcomes should not be interpreted as a failure to adopt this framework, or as a failure to meet some other standard. Embedding information literacy into a curriculum takes time. It takes thorough planning and understanding of the condition of online information ecosystems, the condition in which other countries are meddling with Canadian affairs, and of course, Canadian culture. The learning outcomers were used to guide this research in exploring what k elements of information literacy are embedded in the curriculum in Nova Scoita. The purpose of this study was to map information literacy threshold concepts to the Nova Scotia secondary learning outcomes created

by the Department of Education and Early Childhood Development through a ACRL's information literacy lense. Evidence from this study suggests the government should consider examining the curriculum further to understand where information literacy is lacking.

References

ACRL. (2015). *Framework for information literacy for higher education*. ALA.

Anderson, A., & Johnston, B. (2016). Curriculum Development and the New Curriculum for Information Literacy. In *From Information Literacy to Social Epistemology* (pp. 83–101). Elsevier. https://doi.org/10.1016/B978-0-08-100545-3.00006-5

Anderson, J., & Rainie, L. (2020, February 21). Many tech experts say digital disruption will hurt democracy. *Pew Research Centre: Internet, Science & Tech*. https://www.pewresearch.org/internet/2020/02/21/many-tech-experts-say-digital-disruption-will-hurt-democracy/

Austin, E. W., Pinkleton, B. E., Austin, B. W., & Van de Vord, R. (2012). The relationships of information efficacy and media literacy skills to knowledge and self-efficacy for health-related decision making. *Journal of American College Health*, *60*(8), 548–554. https://doi.org/10.1080/07448481.2012.726302

Bergstrom, C. T., & Bak-Coleman, J. B. (2019). Gerrymandering in social networks. *Nature*, *573*(7772), 40–41.

Cronin, J. G. R. (2010). Too much information: Why facilitate information and media literacy? *International Journal of Humanities & Arts Computing: A Journal of Digital Humanities*, *4*(1/2), 151–165. https://doi.org/10.3366/ijhac.2011.0014

Ferrara, E. (2017). Disinformation and social bot operations in the run up to the 2017 French presidential election. *First Monday*. https://doi.org/10.5210/fm.v22i8.8005

Gruzd, A., & Mai, P. (2020). *The state of social media in Canada 2020* [Data set]. Scholars Portal Dataverse. https://doi.org/10.5683/SP2/XIW8EW

Horn, S., & Veermans, K. (2019). Critical thinking efficacy and transfer skills defend against 'fake news' at an international school in Finland. *Journal of Research in International Education*, *18*(1), 23–41. https://doi.org/10.1177/1475240919830003

Kahne, J., & Bowyer, B. (2017). Educating for democracy in a partisan age: Confronting the challenges of motivated reasoning and misinformation. *American Educational Research Journal*, *54*(1), 3–34. https://doi.org/10.3102/0002831216679817

Kupiainen, R., Sintonen, S., & Suoranta, J. (2008). Decades of Finnish media education. *Finnish Society on Media Education*.

Lähdemäki, J. (2019). Case Study: The Finnish National Curriculum 2016—A Co-created National Education Policy. In J. W. Cook (Ed.), *Sustainability, Human Well-Being, and the Future of Education* (pp. 397–422). Springer International Publishing. https://doi.org/10.1007/978-3-319-78580-6_13

Mai, P. (2020, May 14). *[New Survey Report] Inoculating against an Infodemic: A Canada-Wide COVID-19 News, Social Media, and Misinformation Survey | Social Media Lab*. https://socialmedialab.ca/2020/05/14/new-survey-report-inoculating-against-an-infodemic-a-canada-wide-covid-19-news-social-media-and-misinformation-survey/

Matsubayashi, M., & Freund, L. (2019). A comparative study of online news use by young adults in Canada and Japan. *Proceedings of the Association for Information Science and Technology*, *56*(1), 730–732. https://doi.org/10.1002/pra2.152

Nold, H. (n.d.). *Using Critical Thinking Teaching Methods to Increase Student Success: An Action Research Project*. 16.

O'Neill, B. (2010). Media literacy and communication rights. *International Communication Gazette*, *72*(4–5), 323–338. https://doi.org/10.1177/1748048510362445

Rubin, V. (2020). Disinformation and misinformation triangle: A conceptual model for “fake news” epidemic, causal factors and interventions. *Journal of Documentation*, *75*(5), 1013–1034.