

Contributions Of Academic Libraries, Librarians, And Information Science To Education For Sustainable Development Research And Implementation: A Canadian Undergraduate Example

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Contributions of Academic Libraries, Librarians, and Information Science to Education for Sustainable Development Research and Implementation: A Canadian Undergraduate Example

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Abstract

There is a growing intersection between library and information science (LIS) and sustainability research. This paper explores the potential of LIS research for advancing sustainability education inquiry spanning areas such as structuring curriculum, pedagogical approaches, information behavior, and cultural collections. Through an examination of recent reviews of LIS scholarship on sustainability, it underscores the imperative for further investigation into the intersection between LIS and sustainability, particularly in education and cultural domains. This paper delineates potential avenues for future research, highlighting a gap in the literature pertaining to the implementation of sustainable development education goals within higher education institutions at the interdisciplinary level. Drawing from illustrative examples, this paper contributes to addressing this gap by showcasing how LIS scholarship, including Scholarship of Teaching and Learning (SoTL), has been leveraged and applied by a subject librarian, teacher, and researcher in sustainability education. The context of this implementation is within sustainability courses that are part of an interdisciplinary sustainability certificate at an undergraduate university.

Keywords

Sustainable development goals
Sustainability competencies
Teaching and learning
Libraries
Librarians
Information science
Information behavior

1. Introduction

In 2015, the United Nations (UN) Sustainable Development Goals (SDGs) provided a road map towards global sustainability. The SDGs included several goals to which libraries and the field of library and information science (LIS) could contribute. Quality education, SDG number four, Quality Education, underpins the rest of the SDG framework as a key goal for a sustainable society. Access to quality education and information is a core value of librarianship, as is sustainability and the use of information and education to facilitate sustainable choices (American Library Association 2024). goal ; relevant to libraries, which underpins the rest of the SDG framework. Education has long been identified as key to a sustainable society in investigations of sustainable information science (Nolin 2010); AQ1

In 2002, the International Federation of Library Associations and Institutions (IFLA) issued a statement on libraries and sustainable development, recognizing the essential role of libraries and the access to information they provide for sustainable development. In 2022, IFLA added a statement on the essential nature of libraries in providing sustainable development information and called on governments to consult library information to inform sustainability decisions. These are some of the signposts along the road to developing the current interest of libraries, librarians, and LIS in sustainability.

The largest overlap between the mission of academic libraries and the UN SDGs is in education. A 2023 OCLC survey of over 1700 library staff around the world reported that SDG number four, Quality Education, was identified as the top goal where responders felt libraries could have the greatest impact (Connaway et al. p. 275). The scholarship of teaching and learning (SoTL) studying sustainability education is a growing area of applied research for universities and academic libraries (Kamińska et al. 2022a, b; Fia et al. 2023).

LIS research on sustainability has focused on sustainable libraries and collections, including how open access contributes to sustainable development. However, there are other areas where LIS research can contribute to sustainability, notably on education and cultural topics. There is indication in the literature that the LIS research on sustainability still has room for development and expansion (Meschede and Henkel 2019; Kahlid et al. 2021; Repanovici et al. 2021; Kamińska et al. 2022a, b).

Fia et al. identified tension between institutional sustainability goals and inter-departmental implementation of teaching sustainability and suggested the field could benefit from further investigation of teaching implementation at this level (2023, p. 622). There is potential for LIS research in general, and for information literacy research in particular to contribute to sustainability education research and possibly to bridge the gap (Fia et al. 2023) identified if LIS research is applied to sustainability education. This potential is illustrated in this paper using the experience of a librarian involved in teaching and researching an interdisciplinary sustainability certificate program at MacEwan University, a Canadian undergraduate university. The goal of this discussion is to provide insight into how libraries, librarians, and LIS research can contribute to sustainability educational research efforts to ultimately improve sustainability education and better equip the citizens of the future with the ability to achieve the SDGs.

2. Library and Information Science Research on Sustainability

Owing to the interdisciplinary nature of both LIS and sustainability, in 2013, Chowdhury suggested that “sustainability should become a mainstream research topic within information studies” (p. 617). However, Meschede and Henkel’s (2019) review of LIS literature found that Chowdhury’s suggestion had not yet come into being. Meschede and Henkel found that although the number of LIS publications addressing at least one of the main pillars of sustainability (social, economic, or environmental) had risen in the last ten years, it was not keeping pace with the relative prominence of this topic in other scientific discourses (2019, p. 1364). Further, Meschede and Henkel found most publications they reviewed focused on the sustainability of libraries themselves as opposed to other contexts (2019, p. 1363). Kahlid et al. conducted a review of sustainable development literature in LIS and found that there was a focus on the green nature of library buildings and digital libraries as opposed to other actions or practices (2021, p. 6). This is part of the “Green Library Movement” which according to Kaminska et al. in their discussion of collaboration insights, note includes not only green library buildings and practices, but also sustainability of collections, including content, acquisition, and preservation (2022, pp. 16–818).

Kaminska et al.’s (2022a) review included a much larger sample size (751 papers p. 5) of LIS literature on sustainability topics versus (Meschede and Henkel’s 2019) sample size (81 papers p. 1358). The main categories of literature identified by Kamińska et al. (2022a, b) include buildings, information and information communication technology (ICT), collections, education, culture and other. The study found that although articles focused on buildings were still well represented in the literature, that the area with the most intensive research interest explores information and ICT topics related to sustainability and LIS (2022, p. 26). According to Kaminska et al., the focus on education is growing and frequently connected with information and ICT topics in the scientific literature (2022, p. 26). They differentiate between studies on the topic of information, which focus on topics such as access to information and information society and those focusing on ICT and green sustainable information systems (2022, p. 7). Additionally, culture was identified by Kaminska et al. as a newly developing area of LIS sustainability research (2022, p. 18).

Kaminska et al. also describe the focus in the LIS research on education as incorporating sustainable thinking and concepts, mostly environmental, into information literacy teaching (2022 p. 14). This is the reverse of the librarian author’s experience discussed in this paper where IL teaching was incorporated into sustainability curriculum and IL research, pedagogy and knowledge was used to enhance and inform teaching sustainability. Repanovici et al. (2021) conducted a review of studies investigating what IL can contribute to sustainability educational. This is an area that warrants future investigation. Kahlid et al. identified educating both information professionals and the public on sustainability as a major challenge and priority for libraries (2021, p. 6). These reviews all indicate there is

significant room for growth and development of LIS research on sustainability in general and particularly studies focusing on the areas of education and culture.

3. How IL Research Can Inform Sustainability Curriculum Planning and Research

In 2014, Jankowska et al. interviewed over 200 academic library and LIS school employees and students. The authors report that when respondents were asked how engaged academic libraries should be in campus sustainability teaching and curriculum activities, a total of 95% felt libraries should be engaged to some degree (p. 9). The author of this paper, as sustainability subject librarian, was involved with the initial planning for the Sustainability Certificate at MacEwan University. There were discussions with representatives from the University's Office of Sustainability as to how sustainability content and learning could best be integrated into existing academic programs. LIS literature advocates for integrated approaches for teaching transferable skills such as information literacies (Wang 2011). Therefore, the author supported the university's approach to integrating sustainability learning, which involved having sustainability content embedded into existing courses in various programs as well as having specific interdisciplinary sustainability courses as core requirements for the certificate. The sustainability (SUST) courses are open to students in any program and can be taken as electives and put together with disciplinary courses identified as including sustainability content to achieve the sustainability certificate. As with information literacies, sustainability competencies benefit from being contextualized within the student's main area of study. This was something that students are encouraged to do in the SUST courses by relating what they are learning about sustainability to their home academic discipline in discussions and assignments. The vast body of research into best practices for embedding IL instruction into disciplinary programs is relevant to research on sustainability education because of the shared interdisciplinary and transferable nature of IL and sustainability literacy.

4. Researching Teaching IL and Sustainability: Similar Challenges and Pedagogical Considerations

The SDGs form a framework for understanding the work that lies ahead to achieve sustainability. To contribute to the SDGs, people in society must gain the competencies, skills, knowledge, and attitudes required to act to address sustainability challenges. Towards this, a set of key sustainability competences has developed in higher education (Redman and Wiek 2021). Kaminska et al. based on the conclusions of studies they reviewed, posit that information literacy, "can be seen as a key to the economic, social, and cultural development of communities, institutions and even nations" (2022, p. 15). Traditionally, IL, including digital literacy and aspects of critical thinking, have been seen as key to developing sustainability competencies that contribute to sustainable decision-making. Repanovici et al. (2021) investigated the connection between IL and sustainable thinking in their study that examined IL literature via a quantitative literature scope and corroborated what they found in the literature with a qualitative research study involving students taking an IL course where sustainability information was integrated. Their study's results section demonstrated a positive correlation showing that that between IL learning and positively impacts students' ability to develop sustainable thinking and behavior. Repanovici et al. (2021) identified the importance of libraries offering both IL and sustainability curricula to contribute to developing sustainability competencies. This suggests that integrating IL into sustainability focused curriculum could potentially have similar benefits.

There are deep similarities between the challenges of teaching key sustainability competencies and IL concepts as represented by the Association of College and Research Libraries (ACRL) Framework for Information Literacy for Higher Education (2015). This is because the sustainability competencies and information literacy framework have a lot in common, including that they espouse transferable skills that are to be used across disciplines and modified for use in different contexts, be they personal and/or professional areas of life. These frameworks include not just skills, but attitudes, ethics, ways of thinking, being, and approaching situations. To gain information and sustainability competencies the learner must first understand the complex information and ecological, economic, social, and cultural systems they are a part of. Kominska et al. have preliminarily defined "sustainable information literacy" as expanding traditional IL abilities to include sustainable thinking, such as being aware of the impact of one's information choices on the pillars of sustainability (2022, pp. 14–15). An example of how IL pedagogy can be applied to teaching the sustainability competency of systems thinking is that the SUST 201 course included a module on systems thinking. In this module students were learning how to map a personal system they were a part of and understand how the facets impacted each other. Having them map a personal system instead of a system more removed from their daily life drew on the author's experience as a librarian teaching information systems. When teaching students about academic information systems, examples are used that students are more familiar with such as streaming media services to illustrate how academic databases work. Students commented in course evaluations that they appreciated it when the sustainability concepts were teaching to real-life examples they could identify with.

Using problem-based approaches to teach and research information literacy, by starting with an information need, is embedded into library and information science. Information literacy has been defined by the ACRL as "recognizing when information is needed and knowing how to locate, evaluate, and use it effectively" (2000). Research has suggested that problem-based approaches to IL can help students contextualize their learning (Diekema et al. 2011). Using a problem-based approach is also good fit for sustainability learning because there are so many pressing sustainability problems to be solved, with climate change being the largest and most universal. In the SUST 201 course, students were asked to apply what they learned via readings and other materials to class discussions on sustainability problems that they identified as personally relevant. Research supports the use of problem-based learning in sustainability education (Cörvers et al. 2016; Lozano et al. 2017).

Some of the pedagogical approaches employed in the SUST 201 course were active and applied learning, both mainstays of library instruction as practicing applying information skills is key to being able to effectively use them. In addition, community engaged learning was used. For example, the final change maker assignment asked students to take a small but meaningful action of their choice in their community to contribute towards sustainability and the SDG's as a change maker. They were asked to write a report situating this action in the course literature and reflecting on it. To support their research in addition to library resources, students were introduced to open published resources. Making students aware of open resources highlighting the inequalities present in traditional publishing systems. Knowledge of open information also allowed students to start to become aware of the impact their information consumption and dissemination choices as citizens and budding scholars has regarding moving towards a more sustainable system of information.

Participating in community engaged learning helped students to apply their sustainability knowledge and skills to affect change. This encourages students to take action toward the SDG's as the UN has encouraged the world to do in their proclaimed *decade of action* beginning in 2020. There is evidence that community engaged learning pedagogies are effective for sustainable learning (Lozano et al. 2017). Combining these pedagogies with self-reflection is key to their effectiveness. A growing body of work focuses on the importance of reflection for sustainability education (Howell 2021; Konrad et al. 2021; Sandri 2022). Reflection has long been identified as a key pedagogy for developing IL skills (Jacobs 2008). Each week in SUST 201, students were asked to reflect on a question related to what they had read and were learning before leaving class each week.

In 2021, the author conducted a SoTL investigation to examine pedagogy for teaching and learning sustainability competencies in the Sustainability Challenges (SUST 301) course at MacEwan University (Munro and King 2022). Students in the course were asked to complete pre and post assessments of the level their of sustainability competencies using a tool adapted from Molderez and Fonseca (2018). Pre and post self-assessment methodology is also used to study student development of information literacy. Students wrote a reflection on what they learned, their learning experience and the experience of conducting the self-assessment as part of their research participation. The authors found that the problem-based, and community engaged pedagogies did contribute to students' increased learning of sustainability competencies and students felt the self-assessment and reflective process contributed to their awareness of how they had developed their sustainability competencies throughout the course (Munro and King 2022, p. 23).

The community partner project, which was the main assignment for the SUST 301 course in the SoTL study, connected students with a local organization to help them address a sustainability challenge the organization faced. This project illustrated to students how they can continue to contribute to sustainability beyond their studies by bringing what they learn into their work civic life. StudentTheir reflection on this assignment as well as their self-assessment of their development of sustainability competencies revealed ways for them to continue to gauge areas of sustainability knowledge they will need to develop as they encounter new challenges, setting them up for life-long learning (Munro and King 2022, pp. 11–12). The connection between education and life-long learning is something that was also identified by Repanovici et al. as a commonality in LIS research literature (2021, p. 5). Colomer et al. (2020) suggest that reflective learning supports students in developing their ability to reflect on their competencies. Knowing their strengths empowers people to recognize their ability to impact their contexts. Through this recognition, they are better able to contribute to sustainability throughout their lives. Life-long learning has been identified as key to being able to constantly adapt to make progress with the complex problems facing our planet and achievement of sustainability (Bates et al. 2022).

5. How Information Behavior Research Can Inform Research on Sustainability Education

The goal of interdisciplinary research on misinformation and its role in contributing to climate change denial is to understand the circumstances and behaviors related to information seeking/consumption on the topic of climate change. Additionally, the purpose is to understand how knowledge building and critical thinking interacts with worldview and fear of economic and social change in this complex problem (Ranney and Velautham 2021). The problem of misinformation and pseudoscience is contributing to the climate crisis because it threatens human motivation to adapt. It has been suggested that libraries have a role to play in combating misinformation on climate change via both provision of open access information and teaching critical thinking, information and digital fluency (Appleton and Woolley 2023).

Similarly, the field of health education has been grappling with the widespread dissemination of misinformation in relation to vaccines, which came to a head during the COVID pandemic. After the World Health Organization (WHO) declared a pandemic in 2020, they identified the problem of the "infodemic", which they defined as, "too much information including false or misleading information in digital and physical environments during a disease outbreak" (2022). Specifically, the problem of misinformation is partially addressed by a core tenant of information literacy, evaluation of credibility of information sources, as discussed by Savolainen (2023) in their study of online social media misinformation relating to vaccines. In both these areas of study that impact sustainability, information science has suggested ways to better educate on these topics and how to package scientific information so that it is more likely to combat misinformation. Moreover, access to open published medical research, something academic libraries advocate for and facilitate, creates an environment that allows scientists and members of the public to use these trustworthy sources to debunk misinformation on social media platforms, as suggested by Timothy Caulfield, Canada Research Chair in Health Law and Policy at the University of Alberta (2020). In this way, information behavior research contributes to sustainability research on how to educate the public on sustainability topic.

The ways that people understand health and well-being are intricately linked to successful sustainability of humans on earth. The role that information literacy plays in global understanding and action towards solving problems of health and climate change is undeniable. The author incorporated research studying the information behavioral aspect of climate change denial into the SUST 201 course. This

provided students with a background understanding of how people interact with information on sustainability topics. This background knowledge supported students in carrying out the interpersonal competency and skill development activity where students had a discussion regarding a sustainability topic with someone they knew held differing views. The purpose of this exercise was to practice finding common ground and connecting with people on a personal level in relation to sustainability topics. This activity builds on information science's understanding that many people turn to those they know for information they are seeking (Evans et al. [2010](#)).

6. Collections, Cultural, and Community Connection Contributions

In addition to the original sustainability pillars of environment, economic and social, culture has been identified as a relatively new, and not fully explored area of sustainable development research (Kamińska et al. [2022a](#), [b](#), pp. 16–819). In a recent review of 102 research publications on libraries and sustainability, Mathiasson and Jochumsen identified only three studies focused on cultural subjects (2022, p. 1287). This presents an opportunity for LIS research in sustainability, as libraries are cultural institutions recently concerned with collecting and making available cultural knowledge. Additionally, information behaviors are heavily influenced by culture.

Many libraries provide reading guides or guides to key literature on sustainability. A good example of a local perspective is the University of British Columbia's (UBC) library's *Climate and Climate Change in the Okanagan* guide. An example of expanding the topic to include cultural aspects of sustainability is the *Xwi7xwa Library Indigenous Land Based Activist* guide which includes not only Indigenous authors' works on this topic but information on campaigns and movements as well. These guides assist with local sustainability research, education and public activism. An important aspect of understanding sustainability is not just people's physical connection with the land, but also their cultural and spiritual connection. Many factors have contributed to separating people from being connected with the land they live on, including colonialism, industrialization, and urbanization.

Libraries in North America and globally have more recently been focused on researching and introducing initiatives to collect and give voice to Indigenous authors who were previously unheard in academic discourse (Hurley et al. [2017](#)). There has also been a recent emphasis on research and initiatives focused on decolonizing library collections and processes (Blume and Roylance [2020](#)). These missing voices in libraries are due to systemic inequalities in our society. Bringing such voices into the discourse around sustainability contributes to the social equity required for sustainability. It is hard to properly value what is not well understood, so students need to learn about Indigenous peoples' diverse knowledge, ways of thinking, and ways of being in relation to the land. MacEwan University library has an *Indigenous Collections Policy* aimed at increasing the library's collection of Indigenous authors, and has also created a highly visible *First Voices* print collection aimed at facilitating access to contemporary literature by Indigenous authors.

These areas of LIS research and practice can contribute to sustainability education, for example, the librarian author included readings on the topic of connection to the land by Indigenous authors, including Leanne Betasamosake Simpson, for students to read and discuss in SUST 201. In addition to written works and videos by Indigenous authors, students were able to benefit from the strong relationship between the university library and kihêw waciston Indigenous Student Centre through class visits by nêhiyaw (Cree) educators. Language and land teachings connected to the land were shared with students, which helped the students begin to understand the value of local knowledge for guiding sustainability. Additionally, students to participate in a *blanket exercise*, as well as a discussion on privilege led by a nêhiyaw faculty member. Students also experienced additional introductory cultural teachings by a nêhiyaw Elder and a nêhiyaw Knowledge Keeper. Introduction of these living sources of nêhiyaw knowledge and participating in these experiences helped students to better understand Indigenous cultures and knowledges and the value of these for sustainability. These teachings and activities also helped to illustrate colonial marginalization, assimilation and genocide in Canada and helped open students to challenging conversations. They helped deepen student understanding of how colonial practices separated and continue to separate all people from the land. These are some examples of the ways that libraries, through their partnerships and attention to inclusion and equity of information, as well community-building, can contribute to sustainability research and education concerning the cultural pillar.

7. Conclusions

LIS research is contributing to, and has the potential to contribute to, the advancement of sustainability education and research in several key areas. Firstly, the growing field of LIS research on sustainability presents opportunities for expansion, particularly in the domains of education and culture. Secondly, investigations into the structuring and integration of IL curriculum can provide valuable insights for research into structuring and integration of sustainability curriculum. Similarly, research into integration of sustainability content into IL instruction programs and vice versa has been identified as a potential way to strengthen development of sustainable thinking. Thirdly, the parallels between IL and sustainability literacies underscore the importance of LIS SoTL research for providing evidence of pedagogical strategies for fostering sustainability competencies. [AQ2](#) Fourthly, studies exploring information behavior, particularly concerning the dissemination and consumption of climate and health information, stand to enrich sustainability research efforts aimed at fostering awareness and shaping public attitudes. Finally, the exploration of cultural dimensions within LIS research, such as the examination of academic library collections documenting cultural knowledge, holds promise for advancing our understanding of the cultural underpinnings of sustainability and for enhancing sustainable development educational research and practice.

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