Key Performance Indicators for Assessing Sustainability in Academic Libraries

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Abstract

This paper explores the concept of sustainability and how it is measured as related to academic libraries in the United States, and considers how key performance indicators (KPIs) could enhance sustainability efforts in these libraries. The core values of the American Library Association include sustainability, and there are several associations that outline the need for sustainability and provide suitable policies and guidelines surrounding sustainability for its successful implementation. However, based on the literature, owing to the complexity of sustainability, often only one of the issues is addressed at a time, with little consideration for their interactions with the other issues, and most often, these are not directly assessed or measured. To address this, a survey was developed based on sustainability efforts in libraries, and how they are measured. Although a limited response was received, the results indicated that few libraries that embraced sustainability holistically. Furthermore, there was limited assessment of sustainability initiatives, with little direction from leadership in most cases. This will not result in sustainable solutions, and it is necessary for library leadership to recommit to their values, and promote a culture of sustainability to benefit their communities in the long term. Libraries could start by promoting environmental information literacy within their libraries, and following through with assessment and benchmark programs to continually enhance the process. Although there are often more pressing needs and concerns, the issues surrounding sustainability in academic libraries should be prioritized for the preservation and sustainability of scholarship and the long-term wellbeing of the community.

Keywords: sustainability, academic libraries, sustainability assessment, key performance factors, survey

Key Performance Indicators for Assessing Sustainability in Academic Libraries

Sustainability in academic librarianship is not a new concept, although it is a current trend. Over 50 years ago, the National Environmental Policy Act of 1969 committed the United States (US) to develop and maintain conditions where people and nature can coexist equitably together, ensuring the social, economic, and other requirements of current and future generations are and will be met (Environmental Protection Agency, 2014). To fully understand sustainability, it is necessary to understand how its three main pillars of environmental, social, and economic aspects interact. Generally, when sustainable solutions are found to protect the environment, communities are strengthened and prosperity is cultivated (Environmental Protection Agency, 2015). Henk (2014) defines sustainability in terms of "ecology, equity and the economy" (p. 11), explaining that it is necessary for healthy economies to be developed while respecting the environment, with benefits distributed throughout society to support community self-sufficiency. Therefore, owing to the complex interactions between humans and the ecosystem, it is necessary to address challenges within all these areas to ensure that potential solutions in one area do not cause problems in another, and that all aspects of sustainability should be considered when making decisions and developing policies (Henk, 2014).

These definitions explain the need and theory of sustainability that is essential for communities to thrive on a continual basis. The challenge is to ensure that sustainable measures are implemented and then continually assessed and measured. This is pertinent for all organizations, but especially libraries, since they are fundamental for "promoting community awareness about resilience, climate change and a sustainable future" (American Library Association, 2019a), and as such, have often been seen as leaders in sustainability, promoting sustainable practices (Rowley, 2006; Tanner et al., 2019); nurturing resilience, community

regeneration and sustainability through “economically feasible” and “socially equitable and environmentally sound” practices (Tanner et al., 2019, p. 365) built on sound policies. This paper will discuss the policies and core values developed to promote sustainability within academic libraries in the United States (US), the role of library leadership in addressing issues surrounding sustainability, and what major initiatives regarding sustainability are being implemented. In addition, this paper will assess the key performance indicators (KPIs) that are currently being and can be used to measure sustainability in academic libraries to enhance sustainability initiatives.

Literature Review

Policy Development

The American Library Association (ALA) initiated “Libraries Build Sustainable Communities”, after realizing a need to include sustainability within libraries in collaboration with Global Learning of New Jersey. The components of a sustainable community were defined by this project as: “economy - the management, or stewardship, of the resources; ecology - the relationship of the community with its environment, particularly natural environment; and equity - fairness to all” (ALA, 2019b, p. 1). In addition, the ALA has developed several policies surrounding sustainability, including a resolution on the importance of sustainable libraries passed in 2015; the Environmental Issues Policy; and the following resolution - American Library Association Statement on Global Climate Change and a Call for Support for Libraries and Librarians adopted in 2017, which

> “supports librarians, library workers, and educators, as they are guided by the ALA Policy Manual, in their roles for providing rigorous, robust, and accurate reference and referral services; access to data (both historical and current) and information resources,

literature, and collections; and instruction in their use in assisting climate stakeholders' and library users' greater understanding of global climate change." (ALA, 2019b, p. 1).

Sustainability Activities and Core Values

In addition to these policies at the forefront of sustainability, the ALA has several activities that promote sustainability, including the International Relations Round Table (IRRT) International Sustainable Library Development Interest Group, and Sustainability Round Table (SustainRT) (ALA, 2019b). Furthermore, the ALA has provided several resources on 'green' libraries emphasizing resource stewardship. Typically, libraries could be considered inherently 'green' since their resources are shared with their larger communities. However, libraries can be an example in their communities, reducing their environmental impact by employing sustainable practices in daily operations, reducing or minimizing resource consumption, and green buildings (ALA, 2019b). To further support this in the US, the ALA included sustainability as a core value of librarianship in 2019 to include environmentally sound, economically feasible, and socially equitable library practices (ALA, 2019a).

Sustainability in Academic Libraries

Currently, climate change is at the forefront of sustainability, and as such, it is fundamental to develop carbon neutral economies and societies (Henk, 2014), thereby collectively reducing the amount of carbon released into the atmosphere. However, librarians need to be innovative, developing new practices focused on sustainability in all areas of library operations, not only the environment (Henk, 2014). Aldrich (2018) defined the three Es of sustainability for libraries as empower, engage, and energize. All stakeholders should be empowered to enhance the library mission, finding solutions to challenges, and being accountable; stakeholders should feel respected and engage as a team to enhance the mission;

and all stakeholders should feel enthusiastic about the library and its mission, sharing that energy in all community interaction (Aldrich, 2018). In turn, this helps to empower the community, and who actively engage with library staff and leadership, and also become energized by the library (Aldrich, 2018). Academic libraries have responded to sustainability challenges by implementing several practices in the different areas of sustainability including the development of "sustainability thinking and development"; "teaching, learning and research services"; and "community engagement, outreach and partnerships" (Pun & Shaffer, 2019, p. vii). Many of these practices have been based on goals set by the Association of College and Research Libraries (ACRL) Framework for Information Literacy for Higher Education (ACRL, 2016) and the United Nations (UN) sustainable development goals (SDGs) (International Federation of Library Associations and Institutions (IFLA), 2020). Information literacy, which is important within libraries, is fundamental for sustainable development, as it is necessary for communities to be able to critically evaluate all information sourced from reliable sources to make informed decisions and become critical consumers of information. The ACRL framework provides core concepts of information literacy and provides libraries with a baseline to develop and assess information literacy during instruction, assignment, coursework, and curricula (ACRL, 2016). The SDGs are a framework of the United Nations (UN) 2030 Agenda for Sustainable Development, focusing on environmental, economic, and social development, and libraries are fundamental in achieving the goals of this agenda (IFLA, 2020). Furthermore, IFLA has been working on developing the UN 2030 Agenda, "advocating for the inclusion of access to information, safeguarding of cultural heritage, universal literacy, and access to information and communication technologies" (IFLA, 2020, p. 1). This also highlights the relationship between open access and sustainability, highlighting the need for accessibility to quality peer-reviewed

information (Suber, 2016), in addition to information literacy (Henk, 2014). Furthermore, it is necessary to have "well-trained librarians with access to high quality collections" to understand and ultimately achieve sustainability goals (Henk, 2014, p. 12).

Role of Library Leadership

The challenge is to ensure that sustainable measures are implemented, including environmental, social, and economic factors, and that librarians are trained well. Tremendous effort from leadership is needed to ensure that the correct steps are taken to reach some of the sustainability goals. According to Ha (2014), it is essential for leaders and managers to be change agents; librarians will need to address the important questions of why, what, who, when, and how and will need to understand the different types of changes including planned, unplanned, incremental or marginal, transitional, or transformational. Library leadership will also need to develop a sustainability culture, fundamental to the success of a change process (Ha, 2014). Leadership will further need to manage resistance to change. Essentially, librarians will need to recommit to the core ALA values wholeheartedly, and review all operations to confirm that they coincide with these values (Henk, 2014). This has been reiterated by Mataix et al. (2017), noting the importance of transparent and participatory governance and leadership for sustainability initiatives to be effective in academic libraries. In addition, it is also necessary for leadership to establish a well-articulated vision (Mataix et al., 2017), based on stakeholder input and needs.

Sustainable Solutions in Academic Libraries

Academic libraries in the US are meeting some of the challenges of sustainability in different ways, but it seems that these are mostly limited initiatives, except for some large-scale projects initiated in libraries intended to pervade the whole campus and community. For

example, Michigan State University (MSU) has implemented sustainable changes in their libraries, and across their campus (Tans, 2017). The MSU Libraries have a Library Environmental Committee that works with several different departments, including MSU Sustainability, across the university as a leader in sustainability with the implementation and leadership of several projects including, but not limited to, energy conservation and waste reduction through active recycling programs that encourage student engagement, sustainability instruction, and staff seminars to ensure the staff are well trained (Tans, 2017). At Oregon State University Libraries and Press, they have attempted to reduce their greenhouse gas emissions by reducing food waste at landfills through a compost collection program initiated by the library (Hussong-Christian, 2016). Globally, at the University of Calgary in Canada, instruction on sustainable information literacy has been introduced as a first-year course, with the goal of students becoming well-organized and knowledgeable leaders with the ability to make complex decisions (Stoeckle & Campbell, 2019). In addition, some Chinese universities have included sustainable building designs for their libraries, and implemented carefully considered measures to enhance resource conservation and reduce energy consumption on a large scale, as well as several smaller projects, including but not limited to training librarians to "take ownership of sustainability priorities and solutions" (Tanner et al., 2019, p. 371). There are several other similar examples in the US and globally, but these all seem to be small steps in the large and complex sustainability issue.

Economic sustainability in libraries has been brought to the forefront with the impact of the COVID-19 pandemic (Machovec, 2020). For example, resource sharing, which is an important aspect of academic library sustainability, has been negatively impacted with budget cuts, and limited staffing, limited access to essential technology, and the temporary closure of

some facilities in the US (Machovec, 2020). Therefore, it is necessary for library leadership to look for further sustainable solutions to become resilient and help their communities thrive, including the eventuality of unplanned change. Furthermore, to reiterate, it is necessary to consider all the factors of sustainability concurrently when implementing solutions going forward. In China, many libraries have focused on economic and social development, with little consideration for environmental sustainability (Kang, 2018), negatively impacting effective long-term solutions. Kang (2018) further emphasized that libraries in China are essential as an example at their colleges and universities, suggesting that this inequity would negatively impact local communities. For academic libraries to be sustainable, it is necessary to implement the following: environmental literacy education, promoting a 'green' image, carrying out an energy audit and reporting the findings, training eco-librarians, disposing hazardous materials properly, integrating sustainable practices into daily operations, encouraging sustainable resource consumption and environmentally preferable purchasing, and ensuring buildings meet required environmental standards (Kang, 2018). Although not related directly to their libraries, a study of universities in Australia and Austria based on their annual reports found they focused primarily on economic aspects of the universities, followed by social aspects, and with limited focus on environmental aspects (Schaffhauser-Linzatti, 2018), indicating that insufficient focus is being given to all aspects of sustainability, despite the accessibility of knowledge, training, and leadership mentorship. In more impoverished countries, such as South Africa, many academic libraries are facing additional challenges hindering long term sustainability. These challenges include no commitment from leadership, no established standard practices, policies or procedures, limited resources, limited skills and training, no funding, limited collaboration and antiquated technology, as described for digital collections (Masenya, 2020), but could be applied

to all aspects of sustainability. This indicates a dysfunctional system unable to address inequities effectively in any of the areas of sustainability, resulting in a failure to ultimately enhance sustainability in academic libraries and their communities.

Academic Libraries and Sustainability Certification

This leads to how sustainability measures are implemented and can be assessed. The mission of the US Green Building Council (USGBC) "is to transform the way buildings and communities are designed, built, and operated through [Leadership in Energy and Environmental Design] LEED—enabling an environmentally and socially responsible environment that improves the quality of life" (USGBC, 2022, para. 1). The LEED program is considered a performance standard, and does not prescribe specific measures, but comprises point-based rating systems in which developmental projects earn points for meeting certain green building criteria (Carr & Carr, 2013). The primary elements that define a green building focusing on sustainability as outlined by the USGBC (2022) include sustainable sites, water efficiency, energy and atmosphere, materials and resources, indoor environmental quality, design innovation, and regional priority. Regarding academic libraries, several of these areas would be addressed in collaboration with the parent organization. Furthermore, several academic institutions are focusing on sustainability, and have dedicated sustainability departments, e.g., the University of California (USC) has an Office of Sustainability, which has outlined a campus-wide framework for steps to take towards sustainability and becoming carbon neutral (USC, n.d.). To further help libraries take steps towards sustainability, the Sustainable Libraries Initiative (SLI) was established and offers a Sustainable Libraries Certification Program (SLCP), which provides library leaders with a tested, structured path to increase the "library's commitment to environmental stewardship, economic feasibility, and social equity" (SLI, n.d.,

para. 1). For academic libraries this certification is focused on the following seven primary categories to help align efforts with the triple bottom line of sustainability: preparation, campus involvement, community engagement, social wellbeing and resiliency, financial sustainability, collections, and services, and environmental stewardship (SLI, n.d.). This is a relatively new program, with only one academic library to date, Clarkson University Libraries, New York, having completed the certification (SLI, n.d.). Furthermore, this "benchmarking program" to "create opportunities to make better choices on behalf of the local and global community" has been recognized by IFLA (SLI, 2022), and although does not provide KPIs per se for assessment purposes, it does provide best practices regarding sustainability for libraries.

Key Performance Indicators

With or without certification, to assess if academic libraries are implementing and integrating sustainable practices in their services, it is necessary to measure these practices and processes using key performance indicators (KPIs) (Ochôa & Pinto, 2014). A Library and Information Science (LIS) Sustainability Assessment Framework has been developed to include evaluations for the management structure, including environmental, social, economic, and cultural aspects encompassing budgets, education, communication, governance, and equity (Ochôa & Pinto, 2014). This assessment framework could provide a basis to evaluate how library strategies have included these issues. Furthermore, this framework considers quality management and globalization dynamics, helping to define KPIs and risk indicators, in addition to evaluating activities and initiatives based on the expectations of stakeholders and communities (Ochôa & Pinto, 2014). Consequently, it is necessary to continually assess if these services are meeting the needs of the library communities. Furthermore, both the LEED and SLCP also include various measures of sustainability. However, there has been limited documentation of the

process of assessing sustainability in academic libraries in the US. Therefore, in this paper, a survey was designed to assess what sustainability initiatives have been implemented in US academic libraries, and if KPIs are being used to measure sustainability efforts, and if so, what these are. The results of the survey have been discussed based on the findings.

Method

Participants

Fifteen participants took part in the study, including a range of different types of academic libraries from private to public, and community colleges to doctoral granting institutions. Most participants (41.67%) were in managerial roles, followed by employees (33%), and faculty (25%). All participants were obtained via an e-mail that explained the purpose of the study and asked recipients to participate.

Materials and Procedure

An online survey was used to collect data from February 27 until March 3, 2022. The survey contained 25 questions (see Appendix A) and was divided into 6 sections: 1, 2, 3, 4, 5, and 6. Section 1 assessed library size and type; example questions were “Name and type of institution” and “Number of regular staff at your library”. Section 2 assessed if sustainability was included intentionally in the library’s mission and policies; an example question was “Does your library intentionally include sustainability or sustainable practices in its policies?”. Section 3 focused on training around sustainability; an example question was “Does your library have any training around sustainability?”. Section 4 assessed what aspects of sustainability the library focuses on; example questions were “Do you focus on all aspects of the triple bottom line of sustainability through socially equitable, environmentally sound, and economical feasible practices?” and “Which aspects of sustainability do you focus on?”. Section 5 assessed how

aspects of sustainability are measured; an example question was “What are your economically feasible practices and how do you measure them? Please provide brief examples.”. Section 6 assessed if KPIs would help to accelerate sustainability efforts in academic libraries; an example question was “Do you think that more academic libraries would embrace sustainability initiatives if there were standardized key performance indicators to measure their effectiveness?”. Most questions were answered using multiple choice of “yes”, “no”, or “unsure” or a 5-point Likert scale, ranging from “strongly disagree” to “strongly agree”. Several questions were open ended, allowing for participants to respond freely.

Results

Institution and Library Descriptions

Data collected and analyzed from the survey indicated that the 15 participants that completed the survey represented a range of academic institutions, including large private research and PhD awarding institutions, state colleges, smaller private colleges, to community colleges awarding associates degrees (Table 1).

Table 1

Representative Institutions

Name of Institution	Type of Institution
Pasadena City College, California	Community College, Public
Valencia College, Florida	Community College, Public
Cornell University, New York	Land-grant Research University, Private
University of Southern California, California	Research University, Private
Florida Institute of Technology, Florida	Research University, Private
Oregon State University, Oregon	Land-grant Research University, Public

Michigan State University, Michigan	Land-grant Research University, Public
Mississippi State University, Mississippi	Land-grant Research University, Public
Penn State University, Pennsylvania	Land-grant Research University, Public

In addition, 41.67% were in managerial or leadership roles, 25% were library faculty, and 33% were library staff. The number of the staff in the libraries, corresponded to the size of the institutions where 50% of participants had 5–25 staff members, 33.33% of participants had more than 75 staff members, and 8.33% of participants each had 1–4 and 26–75 staff members (Table 2). In addition, 54.55% (n = 11) of participants noted that they had a dedicated sustainability committee, that meets "monthly", "quarterly", or as needed.

Table 2

Relative Library Staff Sizes in the Representative Libraries

Staff Size	Number of Libraries
1–4	1
5–25	6
26–75	1
> 75	4

Sustainability in the Library Mission Statement and Policies

Regarding the library mission statements and policies, three participants (23.08%, n = 13) indicated that sustainability was included in the mission statement of their library, whereas six participants (46.15%, n = 13) indicated that it was not, and the remainder (30.77%, n = 13) were

unsure. Furthermore, eight participants (61.54%, n = 13) indicated that sustainability or sustainable practices were intentionally included in the library policies, with four participants (30.77%, n = 13) indicating that it was not, and one participant (7.69%, n = 13) was unsure. Two participants included examples of sustainability being intentionally included in policy development: one participant noted that "sustainability is part of our strategic plan", and another indicated that their library has an "Open Access Subvention Fund". Sustainability practices included "reselling or recycling weeded print materials, compositing in the library, encouraging recycling for staff and users, programming and information sharing, building a sharing economy for books, tools, electronics, and seeds through our various collections", and "use of electronic materials whenever possible, recycling in buildings and at events".

Sustainability Training in the Library

Considering sustainability training in academic libraries, 60% (n = 15) indicated that they did not receive training, 6.67% (n = 15) were unsure; and 33.33% (n = 15) indicated that they did receive training. Of the training received, one participant noted that their "Library Environmental Committee provides a sustainability orientation for all new staff. The committee also coordinates programming and trainings on environmentally and sustainability related topics". Another participant noted that there was some training in the "library employee lounge" around "recycling, e-waste, paperless reusable items, [and] water refill stations".

How Sustainability is Measured

The participant responses generally concurred that there was generally no direct measurement of sustainability within their libraries. For example, "We don't measure or assess [sustainability] in any way"; "We don't have any formal assessment of sustainability in our library in particular…There is a lot more we could do at the library level"; "On the whole, we

don't measure sustainability. It is simply embedded in a lot of our practices"; and "It is not measured specifically". However, some participants noted that sustainability data was being obtained in different ways, such as "We partner with our on campus recycling center for data on waste diversion rates for the library"; and "Another sustainable indicator could be the portion of the budget provided for e-book and digital resources vs. print".

Sustainability Focus in the Library

When reflecting on whether their libraries focused on all aspects of the triple bottom line of sustainability through socially equitable, environmentally sound, and economical feasible practices, only 35.71% (n = 14) of participants agreed, 57.14% (n = 14) disagreed, and 7.14% (n = 14) were unsure. Of the participants that disagreed, one participant noted that "environmental is the main focus [followed by] social justice".

Most participants acknowledged that they had socially equitable practices (64.29%, n = 14), and 35.71% (n = 14) were unsure. The socially equitable practices included "update accessibility concerns in library spaces, devices, and in the online environment offers professional development to all library employees publicize diversity collections, programming, and services"; "Fine free for all library-owned materials (except technology). Students can request creation of any course-reserves, including purchasing request if we don't have item (not just faculty). Creation of digital copy for course reserves lending for library-owned items as preferred option for course reserves. Hot spot lending to support those with limited access to wireless off campus, long-term laptop lending (year+) during the COVID closure along with long-term lending of library materials (and shipping to user destination) during COVID closure"; and "No late fines, cultural exhibits and events, technology device borrowing such as Wi-Fi hotspots, laptops and graphing calculators for semester long loan".

Regarding environmentally sound practices, 58.33% (n = 12) of participants agreed they had these in place, 16.67% (n = 12) did not, and 25.00% (n = 12) were unsure. The environmentally sound practices included "as a college, we have sustainability goals that extend to library buildings and spaces: this includes climate action plans for energy conservation and emissions, decreasing water waste, improving transportation and campus multi-use paths"; and "sharing/reusing materials, composting, recycling, [and] a small green roof and a plant wall in one of our newer office spaces. We get measurement data from the recycling center on the amount of material they are able to divert away from the landfill".

For economically feasible practices, 53.85% (n = 13) of participants agreed their libraries had these in place, 15.38% (n = 13) noted they did not, and 30.77% (n = 13) were unsure. The economically feasible practices included "water reduction (landscape planning, watering, plant selection); recycle programs (electronics, batteries, ink cartridges, etc.); reduction of paper (default printing settings, student printer settings to reduce waste); refillable water stations; lighting & energy consumption (energy efficient lighting, automation, mixture of renewable onsite (solar) and local energy procurement (solar, electric fleet, etc.); college funded free employee and student use of local public transportation - long term reduction of college reimburse for intercampus travel; car emissions); development of energy, emission, water reduction master plan"; and "Hard to separate from other practices...course reserves (digital and physical) that students can initiate (not just relying on faculty initiation). Lots of equipment lending, all measured by checkouts". A participant noted that their library has a healthy budget, and as such can explore various projects, including the installation of secure and covered bike parking at the library - a covered area with a locked fence around the bike racks. The library staff were surveyed on commuting habits and bike usage to understand how this might be used, but

the cost of the project was not sustainable, and so alternatives were considered. Another participant indicated they have " a set budget we maintain and do not exceed [and] balance [the] use of the budget based on needs and requests from the campus community and curriculum as a priority. [They] purchase unlimited user access licenses almost exclusively for … eBooks and encourage instructors to use these for class readings".

Budget for Sustainability Initiatives

Regarding budgeting for sustainability initiatives, most participants were unsure (45.45%, n = 11) if this was a budgeted item, 18.18% (n = 11) did not budget for sustainability initiatives, and 36.36% (n = 11) did. In addition to the responses above regarding different sustainability practices, participants responses regarding the budget included "We budget for initiatives in that if we purchase things, we keep sustainability in mind"; and "The library does not have a budget line specifically for sustainability initiatives, but we do have money available for one-time improvement projects to the building and it has been used for sustainability projects in the past like converting drinking fountains to water bottling filling stations and installing the plant wall".

Impact of KPIs Regarding Sustainability Efforts in Libraries

When participants considered if KPIs to measure effectiveness would enhance sustainability efforts in academic libraries, most participants agreed (80.00%, n = 10), with one participant strongly agreeing (10.00%, n = 10), and one disagreeing (10.00%, n = 10). General suggestions regarding measuring and improving sustainability in academic libraries included "Certification is a good incentive (e.g., Sustainable Libraries Certification Program). Ties to the UN SDGs can help match up to overall organizational goals. If the parent organization doesn't support sustainability, then it is more difficult to justify. Many librarians just need some good ideas; things that are easy to implement - beyond recycling"; "It would help to have standards,

certificates, etc. that would be acknowledged by/impressive to campus administration. It can be difficult to gain traction in improving our sustainability without buy-in from leadership. Standards/certificates would both help us assess our own progress, and be useful as a tool for getting the resources we need to meet our sustainability goals"; "Get beyond calling these initiatives sustainability initiatives. Mostly they are initiatives to support student learning [and] they do contribute to sustainability...but that word is…strongly connected to "environmental" initiatives that most people have a hard time connecting unless they see examples of what this can mean in practice"; "I don't think there is anything unique about sustainability projects that would make assessing them different or more difficult than assessing anything else in the library. Libraries with a culture of assessment and improvement will assess their sustainability programs and libraries that don't likely will not"; and "Academic libraries really vary in setting in community colleges vs. 4 year institutions. A one size fits all KPI measuring tool may not be suitable".

Discussion

Although the size of the survey was limited, the results indicated that the participants represented a relatively wide range of the different types of academic institutions and libraries, from small to large institutions, and from private degree granting institutions to public schools and community colleges. Furthermore, the results revealed a wide range of sustainability efforts that have been initiated in these libraries. However, the results indicated that there are relatively few libraries that actively or directly measure their sustainability initiatives through KPIs, and also relatively few that include all three aspects (i.e., economic, social equity, and environmental) of sustainability. Since 2002, when there were emerging definitions of environmental sustainability, as discussed by Wright (2002, p. 109) that included "reorienting

education towards sustainable development; increasing public awareness of environmental issues; and promoting environmental training among educators", sustainability has included a more holistic approach. However, the common themes identified by Wright (2002) do include economic and social equity aspects: "These themes include sustainable physical operations, sustainable academic research, environmental literacy, ethical and moral responsibility, cooperation amongst universities and countries, the development of [an] interdisciplinary curriculum" (p. 118), and these are also common themes found in this research. Nevertheless, it seems that a relatively limited number of libraries in US higher education institutions have embraced a holistic approach to sustainability, and if they have, the process has not necessarily been documented or assessed. The results from this limited survey indicate this, but should be verified with a more extensive survey including more participants.

Many of the findings within this research concur with findings from a systematic literature review on sustainable development in libraries by Khalid et al. (2021). Khalid et al. (2021) found many initiatives concerning environmental aspects, such as reducing the carbon footprint and energy consumption of libraries, transitioning from print to electronic resources, and technological and digital advances, which was indicated in survey responses to initiatives that have been developed. However, several of these initiatives have been developed out of necessity to reach community needs, and not necessarily to intentionally include sustainability efforts to meet these needs. Furthermore, Khalid et al. (2021) also noted the importance of sustainable library design for both interior and exterior spaces. However, major challenges were found in policy development, inability of libraries to adapt to new challenges, and in collection development. In addition, a lack of specificity in job descriptions surrounding sustainability efforts was also noted (Khalid et al. 2021). Furthermore, it was noted that there was limited

education or knowledge transfer surrounding sustainability (Khalid et al. 2021). This was found in the results of the survey, with few sustainability related educational opportunities for survey participants. Amaral et al. (2015) indicated the importance of sharing knowledge and skills around sustainability and sustainable development, and that higher education institutions have a key role in this. As such academic libraries are centered to provide this information and these skills.

A common theme identified throughout this process, and one that has been reiterated in the literature, is a lack of measurement or assessment of the sustainability initiatives. This was noted by a participant, who indicated that libraries assess most systems through data, and therefore, it would seem obvious that they would assess this too; however, do not. Another common thread is that it is necessary for sustainability initiatives to be driven by leadership, which was alluded to in the results. It is fundamental to obtain leadership support for sustainability to be driven by clearly articulated management processes (Nolan, 2012). In this regard, Disterheft et al. (2012) reiterated the importance of implementing suitable management and assessment tools to measure the process, as well as the importance of top-down initiatives. However, Roos and Guenther (2020) stressed the importance of a holistic approach. However, research has indicated that regarding environmental management, there has been limited consideration for strategic methods to determine outcomes (Roos & Guenther, 2020). Roos and Guenther (2020) proposed environmental management performance (EMP) measures for higher education institutions that could be adapted to measure sustainability in libraries. The main criteria in this system include a focus on sustainability monitoring, organizational structure, sustainability processes, sustainability objectives, and sustainability policy (Roos & Guenther, 2020). As noted in the results, there were limited policies that were directly related to or included

sustainability, as well as limited assessment tools or management structures mentioned. To overcome this challenge, assessment tools and KPIs could be included to monitor initiatives, and efficient management structures developed to include a culture of sustainability. In addition, for maximum reach, sustainability processes should be communicated and marketed throughout the library, and the key objectives should be clearly articulated through action and strategic plans implemented by dedicated committees (Roos & Guenther, 2020). However, only one survey participant in the current study noted that their library had a dedicated sustainability committee. Finally, in addition to including sustainability in general library policies, sustainability policies should be included in the library to ensure accountability, commitment, and governance (Roos & Guenther, 2020). Roos and Guenther (2020) also suggested that including clearly defined KPIs and top-down management strategies would be effective for the holistic inclusion of sustainability within higher education organizations and their libraries.

Plummer et al. (2021) stressed that it is important to address environmental issues through collaboration in higher education institutions. However, this could be taken further by including sustainability issues as a more holistic approach, as this addresses not only environmental issues, but also social equity and economic issues. Implementing processes for accountability within these collaborations would ensure project success (Plummer et al. (2021). Plummer et al. (2021) suggested the inclusion of "systemic performance assessments" (p. 135), which could provide transparency in the process with continuous feedback, enhancing ongoing improvement in the programs. This type of assessment is critical, allowing for aspects of the project to be adapted, depending on the feedback, and provides continual learning opportunities necessary for sustainability (Plummer et al., 2021). This concurs with the results, where 80% of the participants generally agreed that more academic libraries would embrace sustainability

initiatives if these were assessed using KPIs. However, the suggestions for improving sustainability by survey participants did not all support the need for KPIs and assessment. Furthermore, one participant argued that these initiatives discussed should not be labeled as "sustainability initiatives, [as they are] mostly… initiatives to support student learning". This participant justified this by adding that sustainability is still strongly linked to "environmental initiatives" and is not considered to necessarily include social equity and economic initiatives. Based on this response, it is evident that there should possibly be more sustainability literacy provided to librarians so they can fully understand the concept and consider it holistically. Sustainability literacy is fundamental since sustainability is a core value of the ALA (American Library Association, 2019a), and as such libraries should be seen as sustainability leaders (Rowley, 2006; Tanner et al., 2019). Furthermore, in line with being responsible for prioritizing information literacy through planning and budgeting in libraries (Haycock & Romaniuk, 2018), the same prioritization should be made for sustainability. However, to ultimately achieve sustainability, higher education institutions and their libraries need to have sustainability embedded in their practices, ensuring interpersonal connection; integration and continuity of practices, ideas and knowledge; and inclusiveness and equity (Fisher, 2017). This was seemingly missing from most libraries that participated in the survey. Fisher (2017) indicated that this results in institutional resilience and greater engagement with the mission of the institution. In addition, it fosters a workplace culture that employees value, and therefore adopt the ideals. However, it is necessary that librarians have the necessary knowledge and skills in sustainability to be able to transfer this to stakeholders and the community. The results of the survey indicated that there is limited sustainability training taking place in libraries, with only one positive response indicating an environmental committee that engages with staff, through various

programs and workshops to enhance sustainability knowledge. In this regard, Pavlova-Gillham and Swinford (2017), indicated that for sustainability to be successfully integrated into libraries, effective leadership and change management is required. This could include various phases to enhance the operational development of the library, including visionary leadership and transformation (Pavlova-Gillham & Swinford, 2017). This would include developing and including sustainability in the mission and vision of the library, and developing a strategy to include this. Furthermore, sustainability should be intentionally included in all policies. As noted in the results, sustainability does not seem to be intentionally included in the current policies, and if it is, several librarians who participated in the survey were unaware if it was. Pavlova-Gillham and Swinford (2017), noted that it is fundamental to implement comprehensive planning processes, including strategic, financial academic and physical plants, that is revaluated at least every five years, and to ensure that this is a transparent and inclusive process. In addition, it is necessary to ensure community involvement in sustainability efforts (Pavlova-Gillham & Swinford, 2017). Systems, such as LEED and the SLCP should be included. Intentional planning will result in accountability that will ultimately support sustainability goals, and will ensure a sustainable organizational culture (Aldrich, 2018). Above all, Aldrich (2018) highlighted the importance of benchmarking and data collection for libraries to effectively track their success. Although many processes in the libraries surveyed are being assessed through extensive data collection, this is not being carried out for sustainability efforts, and the data being collected is not being analyzed for sustainability. It is fundamental to benchmark efforts, which can be measured using the SLCP, which is modeled on aspects that have been successful in other industries, including LEED and the Association for the Advancement of Sustainability (Aldrich, 2018).

It appears sustainability efforts are primarily driven through active leadership, and although sustainability is a key topic in libraries, it is possible that the understanding of it is unclear through a lack of educational opportunities for library staff. It is necessary to have a clear understanding of sustainability to be able to translate the mission and vision into action (Aldrich, 2018), and to even take small personal steps towards sustainability to be able to clearly articulate this to others. Once a clear understanding of sustainability has been obtained, then sustainability efforts could be implemented, and clearly communicated and marketed to the community for adequate participation and understanding. The questions in the survey were limited in this regard, and so it is not fully understood if libraries were actively marketing sustainability in their libraries.

Further limitations of this study include a limited number of participants. To provide more depth to the results, the survey should have been sent to more participants. Furthermore, a future survey should aim to obtain more information on sustainability culture and leadership, as well as marketing and communication aspects.

Conclusion

The results of the survey indicated that although sustainability has been included as a core value of the ALA, not all libraries have embraced sustainability. This could be owing to a limited understanding of the holistic approach of sustainability, or to a lack or prioritization from leadership. The results of the survey found that there were limited sustainability education programs for library staff. In addition, the survey results indicated the primary focus was on the environmental aspects of sustainability, although libraries embrace all aspects of sustainability, but not necessarily intentionally. Although there are benchmarks and assessment tools, such as

LEED and SLCP for libraries to include sustainable practices, very few libraries are utilizing KPIs to measure sustainability progress or successful initiatives. Although there are often more pressing needs and concerns, the issues surrounding sustainability in academic libraries should be prioritized for the preservation and sustainability of scholarship and the long-term wellbeing of the community, and to support the mission and vision of their institutions. Future research focus should not only be on KPIs, but analyzing the reasons why most academic libraries have not yet fully intentionally embraced sustainability initiatives into all processes, and how this could be achieved.

References

Aldrich, R. S. (2018). *Sustainable thinking: Ensuring your library's future in an uncertain world*. ALA Editions.

Amaral, L. P., Martins, N., & Gouveia, J. B. (2015). Quest for a sustainable university: A review. *International Journal of Sustainability in Higher Education*, *16*(2), 155–172.

American Library Association. (2019a). *Core values of librarianship*. http://www.ala.org/advocacy/intfreedom/corevalues

American Library Association. (2019b, March 18). *Sustainability and libraries: Home*. https://libguides.ala.org/SustainableLibraries

Association of College and Research Libraries. (2016, January 11). *Framework for literacy in higher education*. http://www.ala.org/acrl/standards/ilframework

Carr, M. M., & Carr, S. L. (2013). *The greening of America's Libraries: LEEDing the way*. Association of College & Research Libraries and the Library Leadership & Management Association.

Disterheft, A., Ferreira da Silva, S. S., Ramos, M. R., & de Miranda Azeiteiro, U. M. (2012). Environmental management systems (EMS) implementation processes and practices in European higher education institutions – top-down versus participatory approaches. *Journal of Cleaner Production*, *31*, 80–90.

Environmental Protection Agency. (2014, November 5). *Learn about sustainability*. https://www.epa.gov/sustainability/learn-about-sustainability#what

Environmental Protection Agency. (2015). *Sustainability primer, version 9*. https://www.epa.gov/sites/production/files/2015-05/documents/sustainability_primer_v9.pdf

Fisher, P. B. (2017). Resilience thinking in higher education: Institutional resilience as a sustainability goal. In W. L. Filho, M. Misfud, C. Shiel & R. Pretorius (Eds.), *Handbook of theory and practice of sustainable development in higher education*. *Volume 3.* (pp. 298–316). Springer International Publishing. https://doi.org/10.1007/978-3-319-47895-1_6

Ha, H. (2014). *Change management for sustainability* (1st ed.). Business Expert Press. https://ebookcentral.proquest.com/lib/socal/detail.action?docID=1702428.

Haycock, K., & Romaniuk, M.-J. (Eds.). (2018). *The portable MLIS: Insights from the experts* (2nd ed.). Libraries Unlimited, an imprint of ABC-CLIO, LLC.

Henk, M. (2014). *Ecology, economy, equity: The path to a carbon-neutral library*. American Library Association. https://ebookcentral.proquest.com/lib/socal/detail.action?docID=1774124

Hussong-Christian, U. (2016). If you build it, will they sort it? Compost collection in the academic library learning commons. *Library Management*, *37*(6/7), 340–351. https://doi.org/10.1108/lm-04-2016-0026

International Federation of Library Associations and Institutions. (2020, March). *Libraries, development and the United Nations 2030 Agenda*. https://www.ifla.org/libraries-development

Kang, Q. (2018). Library directors' concerns and attitudes towards going green and sustainability in China: An unexplored area. *Journal of Librarianship and Information Science*, *52*(2), 382–398. https://doi.org/10.1177/0961000618818874

Khalid, A., Malik, G. F., & Mahmood, K. (2021). Sustainable development challenges in libraries: A systematic literature review (2000–2020). *Journal of Academic Librarianship*, *47*(3), 1–9. https://doi.org.libproxy1.usc.edu/10.1016/j.acalib.2021.102347

Machovec, G. (2020). Pandemic impacts on library consortia and their sustainability. *Journal of Library Administration*, *60*(5), 543–549, https://doi.org/10.1080/01930826.2020.1760558

Masenya, N. (2020). Factors that influence digital preservation sustainability in academic libraries in South Africa. *South African Journal of Library and Information Science*, *86*(1), 52–63. https://doi.org/10.7553/86-1-1860

Mataix, C., Romero, S., Mazorra, J., Moreno, J., Ramil, X., Stott, L., Carrasco, J., Lumbreras, J., & Borrela, I. (2017). Working for sustainability transformation in an academic environment: The case of itdUPM. In W. L. Filho, M. Misfud, C. Shiel & R. Pretorius (Eds.), *Handbook of theory and practice of sustainable development in higher education*. *Volume 3.* (pp. 539–564). Springer International Publishing. https://doi.org/10.1007/978-3-319-47895-1_6

Nolan, C. (2012). *Shaping the education of tomorrow: 2012 report on the UN decade of education for sustainable development*, *Abridged*. UNESCO. https://sustainabledevelopment.un.org/content/documents/919unesco1.pdf

Ochôa, P., & Pinto, L. G. (2014). *Sustainability metrics in library and information services: A quality management framework*. Proceedings of the IATUL Conferences. Paper 5. https://docs.lib.purdue.edu/iatul/2014/plenaries/5

Pavlova-Gillham, L., & Swinford, D. (2017). Becoming sustainable in our own way: Sustainability at the flagship Massachusetts Public Library. In W. L. Filho, M. Misfud, C. Shiel & R. Pretorius (Eds.), *Handbook of theory and practice of sustainable development*

in higher education. *Volume 3.* (pp. 151–170). Springer International Publishing. https://doi.org/10.1007/978-3-319-47895-1_6

Plummer, R. Witkowski, S., Smits, S., & Dale, G. (2021). Higher education institution–community partnerships: Measuring the performance of sustainability science initiatives. *Innovative Higher Education*, *47*, 135–153. https://doi.org/10.1007/s10755-021-09572-8

Pun, R., & Shaffer, G. L. (Eds.). (2019). *The sustainable library's cookbook*. Association of College and Research Libraries. https://ebookcentral.proquest.com/lib/socal/detail.action?docID=5988249

Roos, N., & Guenther, E. (2020). Sustainability management control systems in higher education institutions from measurement to management. *International Journal of Sustainability in Higher Education*, *21*(1), 144–160. https://doi-org.libproxy2.usc.edu/10.1108/IJSHE-01-2019-0030

Rowley, J. (2006). Libraries and environmental management. *Library Management, 27*(4/5), 269–279. https://doi.org/10.1108/01435120610668205

Schaffhauser-Linzatti, O. (2018). Sustainability in higher education's annual reports: An empirical study on Australian and Austrian universities. *International Journal of Sustainability in Higher Education*, *19*(2), 233–248. https://doi.org/10.1108/IJSHE-05-2016-0093

Suber, P. (2016). Open access and the self-correction of knowledge. In P. Suber & R. Darnton (Eds.), *Knowledge unbound: Selected writings on open access, 2002-2011* (pp. 99–105). MIT Press. https://uosc.primo.exlibrisgroup.com/permalink/01USC_INST/273cgt/cdi_ieee_books_7453963

Sustainable Libraries Initiative. (n.d.). *What is the SLCP?* https://sustainablelibrariesinitiative.org/about-us/program-faq

Sustainable Libraries Initiative. (2022, March 10). *Clarkson University Libraries are certified sustainable*. https://sustainablelibrariesinitiative.org/media/document/170

Stoeckle, M. & Campbell, H. (2019). Teaching sustainable information literacy in an academic inquiry-based learning course for first-year undergraduate students. In R. Pun & G. L. Shaffer (Eds.), *The sustainable library's cookbook* (pp. 81–83). Association of College and Research Libraries. https://ebookcentral.proquest.com/lib/socal/detail.action?docID=5988249

Tanner, R., Aldrich, R. S., Antonelli, M., & Ho, A. K. (2019). Libraries as sustainability leaders: ALA's special task force. *Portal (Baltimore, Md.)*, *19*(3), 365–374. https://doi.org/10.1353/pla.2019.0020

Tans, E. D. (2017). Sustainable academic libraries: A campus partnership at Michigan State University. In W. L. Filho, M. Misfud, C. Shiel & R. Pretorius (Eds.), *Handbook of theory and practice of sustainable development in higher education. Volume 3.* (pp. 89–100). Springer International Publishing. https://doi.org/10.1007/978-3-319-47895-1_6

United States Green Building Council. (2022). *Mission and vision*. https://www.usgbc.org/about/mission-vision

University of Southern California. (n.d.). *Office of sustainability: 2020 framework*. https://green.usc.edu/2028-planning/

Wright, T. S. A. (2002). Definitions and frameworks for environmental sustainability in higher education. *Higher Education Policy*, *15*, 105–120. https://doi.org/10.1016/S0952-8733(02)00002-8

Appendix A: Survey of sustainability measurements in academic libraries

Introduction

Thank you for taking time to complete this questionnaire. I am investigating the key performance indicators of sustainability in academic libraries. Your answers will be invaluable for the successful completion of my independent research project for my Master of Management in Library and Information Science (MMLIS) at the University of Southern California. I value your opinion on the questions asked. There are no right or wrong answers - I am just interested in learning your opinions and perceptions. Your answers are confidential and anonymous.

Survey

Q1 Name and type of institution

Q2 Name of library

Q3 Position at library

□ Manager

□ Employee

□ Please note position below

_____

Q4 Number of regular staff at your library

□ 1–4

□ 5–25

□ 26–75

□ > 75

Q5 Is sustainability included in your library's mission statement?

□ Yes

□ No

□ Unsure

Q6 Does your library intentionally include sustainability or sustainable practices in its policies?

□ Yes

□ No

□ Unsure

Q7 Please list the policies that include sustainability or sustainable practices [*If answered Yes to Q6*]

Q8 Does your library have any training around sustainability?

□ Yes

□ No

□ Unsure

Q9 Please list or briefly describe sustainability training in your library [*If answered Yes to Q8*]

Q10 How do you measure sustainability in your library? Please provide a brief description.

Q11 Do you focus on all aspects of the triple bottom line of sustainability through socially equitable, environmentally sound, and economically feasible practices?

□ Yes

□ No

□ Unsure

Q12 Which aspects of sustainability do you focus on? [*If answered No to Q8*]

Q13 Do you have socially equitable practices?

□ Yes

□ No

□ Unsure

Q14 What are your socially equitable practices and how do you measure them? Please provide brief examples. [*If answered Yes to Q13*]

Q15 Do you have environmentally sound practices?

□ Yes

□ No

□ Unsure

Q16 What are your environmentally sound practices and how do you measure them? Please provide brief examples. [*If answered Yes to Q15*]

Q17 Do you have economically feasible practices?

□ Yes

□ No

□ Unsure

Q18 What are your economically feasible practices and how do you measure them? Please provide brief examples. [*If answered Yes to Q17*]

Q19 Does your library budget for sustainability initiatives?

□ Yes

□ No

□ Unsure

Q20 How much does your library budget for sustainability initiatives annually? [*If answered Yes to Q19*]

Q21 Does your library have a committee or task force dedicated to sustainability?

□ Yes

□ No

□ Unsure

Q22 How often does your library meet? [*If answered Yes to Q21*]

Q23 Do you think that more academic libraries would embrace sustainability initiatives if there were standardized key performance indicators to measure their effectiveness?

□ Strongly agree

□ Somewhat agree

□ Neither agree nor disagree

□ Somewhat disagree

□ Strongly disagree

Q24 Do you have any suggestions for measuring and improving sustainability in academic libraries?