

**Sustainability Challenge for Academic Libraries:  
Planning for the Future College and Research Libraries**

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**Abstract**

There is growing concern that a variety of factors threaten the sustainability of academic libraries: developing and preserving print and digital collections, supplying and supporting rapidly changing technological and networking infrastructure, providing free services, maintaining growing costs of library buildings and lowering libraries' ecological footprint. This paper discusses the multi-dimensional issues of sustainability in academic libraries and identifies needs for designing an integrated framework for sustainable strategies in academic libraries. Additionally, the paper presents a synthesis of existing literature on the increasingly popular topic of 'green libraries' and prepares a background towards developing a framework for sustainable strategies in academic libraries.

## **Sustainability Challenge for Academic Libraries:**

### **Planning for the Future**

A paradox of modern academic libraries is that while they strive to introduce new technologies in order to respond to evolving user information needs they are still mostly organized around traditional information formats. A large part of the library building's spaces are dedicated to shelving for books, print and digital materials. A major public perception survey demonstrates that books continue to be the library's brand.<sup>1</sup> In the digital age this poses a challenge for the economic sustainability of libraries since brands are difficult and costly to change. The value and utility of the book is coming under increased scrutiny largely due to the fact that users are trading off physical access to print books and research journals for the convenience and speed of virtual access to digital materials. Considering the trend toward digital collections and social networking services, the key concern is whether the blended model of traditional (mostly based on print resources) plus hybrid (based on mixed of print and digital resources) and a new Library2.0 (based on social networking services) model is socially, economically and environmentally sustainable.

Digital formats and networking services are costly and require extensive technical, human and financial support. Additionally, they consume considerable quantities of energy and water, as well as ink and paper for printouts. Developing a blended model of print and digital resources supported by social networking services has raised a major concern that sustainable progress of academic libraries is threatened by a variety of factors such as: developing and preserving print and digital collections, supplying and supporting rapidly changing technological and networking infrastructure, providing free services to the public, maintaining growing costs of library buildings and lowering libraries' "ecological footprint". This paper addresses these challenges and identifies needs for designing an integrated framework for sustainable strategies that would help academic libraries to become more

sustainable organizations. It is not the objective of this paper to develop such a framework. However, this paper presents the extended review of literature on this increasingly popular topic and prepares groundwork for future research on an integrated framework for sustainable strategies in academic libraries.

### **Library Sustainability: A Literature Review**

In 1987 the United Nations' World Commission on Environment and Development (WCED) came out with a report entitled "Our Common Future," which presented the idea of sustainable development calling for socially and environmentally sound approaches to economic growth. The report defined sustainable development as a balance between social equity, economic growth and ecological concerns "that meets the needs of the present without compromising the ability of future generations to meet their own needs."<sup>2</sup> Since then the issue of sustainable development has moved beyond the UN and environmentalist declarations. In 1990 twenty two university presidents from all over the world signed the Talloires Declaration in France creating the Association of University Leaders for a Sustainable Future (ULSF). With their signature they committed their higher education institutions to incorporate sustainability and environmental literacy into research, teaching, outreach and university and college operations.<sup>3</sup>

After 1990 the concept of sustainability penetrated economic and social growth agendas and influenced academic communities in more than 350 institutions of higher education. A sustainable community, as defined by Sustainable Communities Network (CONCERN, Inc.), is one that "uses its resources to meet current needs while ensuring that adequate resources are available for future generations. It involves all its citizens in an integrated, long-term planning process to protect the environment, expand economic opportunities and meet social needs."<sup>4</sup> In this context, sustainable

growth is essential for institutions and organizations to thrive and contribute meaningfully to the communities around them. As part of the university community, academic libraries need to participate more forcefully in this effort.

Since the 1990s, library literature on sustainability and environmental concerns has grown and garnered much attention. This review identifies four major categories:

- (1) Sustainability of scholarship and collections;
- (2) Green library operations and practices;
- (3) Green library buildings; and
- (4) Measuring and improving sustainability.

### ***1. Sustainability of scholarship and collections***

Authors writing on this topic focus on sustainability of scholarly communication and information in digital and print collections. They understand sustainability as an effort to maintain and secure research collection for future generations, or in the case of scholarly communication, as an endeavor to make them independent from commercial publishers. In scholarly communication the term “sustainable publication” refers to new methods of publications in such formats as: pre and post publication prints, open-access and author-pay models, subscription-based electronic journals, institutional repositories, personal blogs and multi-media publications. Kings and others state “any sustainable means of publication must combine that perception with (1) recognition and appreciation within the academic reward system and disciplinary value system and (2) business models that are sustainable for all concerned in the publication chain.”<sup>5</sup> Taken together, university libraries and presses<sup>6</sup>, organizations and archives offer alternate paths to enabling and preserving scholarly

communication and making it available to the public, but this model requires more cooperation for effective implementation.<sup>7</sup>

Digitization and preservation offer enormous potential to secure not only library collections and materials for future generations but also reduce costs associated with managing print collection. For example, the JSTOR project that not only intended “preservation of scholarship” but also reduced costs associated with the managing of print journals.<sup>8</sup> However, research on digitization and preservation is still in its early stages<sup>9</sup> and libraries need to resolve important complexities in building sustainable digital collections. Leading issues include: using proper technologies,<sup>10</sup> selecting compatible standards,<sup>11</sup> avoiding commercialization,<sup>12</sup> securing economic sustainability for created projects,<sup>13</sup> and achieving continuity and the sustainability of digital collections.<sup>14</sup>

Altogether, authors in this group focus mainly on the sustainability of scholarly communication and information, the challenges of maintaining print and digital collections indefinitely and finding answers to the question posed by Deanna Marcum: “How do scholars and librarians work together to ensure that resources created today will be available in the future?”<sup>15</sup> Clearly, sustainability of scholarship is inherently linked with sustainability of collections and services.

## ***2. Green library operations and practices***

Several authors in this group concentrate on “green” concerns and practices already in place in academic libraries. As Le Bern and Gregory states, “greening is a process, as well as a state of mind, and it calls for taking action. Greening involves a spirit of reciprocity. We take care of the environment that takes care of us, cultivating a relationship with the natural world that sustains us.”<sup>16</sup>

The American Library Association’s (ALA) Task Force on the Environment (TFOE) pioneered “green” concepts in librarianship. Since 1990 the TFOE has aimed at making libraries and the public

aware of diverse environmental information sources, addressed and sought out solutions to green concerns and practices in libraries, worked on greening ALA conferences, and promoted awareness of environmental issues in the ALA and library community. The Task Force has been educating librarians and the public by organizing environmentally focused programs and providing an open-access platform for scholarly environmental communication with the *Electronic Green Journal*.<sup>17</sup> Most recently, the Task Force initiated the “Librarians Raise Their Cups for Planet Earth” project asking librarians to bring their own coffee mug to the 2008 ALA conference in Philadelphia.<sup>18</sup> Additionally, the 14<sup>th</sup> ACRL Conference in Seattle considered “green” as a major theme of the last conference and focused on green points.<sup>19</sup>

Since the 1990s the popularity of green topics has expanded steadily from “green librarian,”<sup>20</sup> “green librarianship,”<sup>21</sup> “green academic sector,”<sup>22</sup> “greening college libraries,”<sup>23</sup> “greening libraries,”<sup>24</sup> “green blogs,”<sup>25</sup> to “go green,”<sup>26</sup> and “green library movement.”<sup>27</sup> Also, the literature reporting on green library practices addresses recycling,<sup>28</sup> noise,<sup>29</sup> and paper use.<sup>30</sup> Additionally the literature presents discussion of environmental user education and environmental literacy represented by contributions from Link,<sup>31</sup> Jankowska,<sup>32</sup> Stoss,<sup>33</sup> Weintraub,<sup>34</sup> Shrode,<sup>35</sup> and Rome.<sup>36</sup>

Primary concerns of this literature include actions that help the greening of academic libraries but as Katherine Dike concludes, “many library services were carrying out green practices, in particular recycling, in the absence of institution-wide green policies.”<sup>37</sup>

### **3. Green library buildings**

Authors addressing the green library building theme discuss architectural designs that consider sustainable solutions in renovating or building libraries. Library buildings use significant quantities of electricity, energy and water as well as forest for paper. They also produce significant amounts of

solid waste. Since 2000 the Leadership for Energy and Environmental Design (LEED) has disseminated codes and standards for green certification for renovation and new constructions developed by the U.S. Green Building Council. The need for creating green and sustainable library buildings was promoted early on by Weiner and Boyden<sup>38</sup> and Brown.<sup>39</sup>

In the early 1990s many public libraries adopted green concepts in their buildings.<sup>40</sup> Green buildings are energy efficient, use non-toxic recycled-content materials and furniture, natural daylight, low-flow toilets and reduce maintenance costs. The Libris Design Project provides detailed design planning and documentation starting from acoustics for libraries through interior finish materials for library technology infrastructure design.<sup>41</sup> Also prominent is the literature on designing library spaces to facilitate the library's new role as research and learning centers as opposed to traditional depository centers.<sup>42</sup> This literature presents sustainable designs for library buildings interiors and exteriors and promotes responsible use of renewable and non-renewable resources in order to achieve healthy and pleasant conditions for the library users while providing good conditions for the collections and services. Answering the question "why should libraries be sustainable buildings?" Johanna Sands explains:

"Libraries serve as symbols of the attitudes and values of their creators and can serve to extend those attitudes and values to future generations of occupants and visitors. Communities with the opportunity to build a new library or update an existing library should prioritize sustainable design measures."<sup>43</sup>

#### ***4. Measuring and improving sustainability***

Another emerging literature focuses on measuring progress toward sustainability following the United Nations recommendations published in 1966 "Indicators of Sustainable Development: Framework and

Methodologies.”<sup>44</sup> Since that publication the literature and projects on national,<sup>45</sup> regional, community and institutional indicators measuring social, economic and environmental progress has grown considerably. Growing commitment of universities and colleges to environmental sustainability has resulted in the vast literature devoted to issues of sustainability for university campuses.<sup>46</sup> Assessment reports and projects conducted by many universities and colleges (among them are Western Michigan University, Penn State, Furman, Concordia, or Michigan State) play an important role in this regard<sup>47</sup>

However, the literature on sustainable university and college campus does not treat libraries as distinct entities. By and large, there is a lack of sufficient data on sustainable and environmental performances of academic libraries. Von Deventer and Snyman<sup>48</sup> propose a multidimensional measurement framework for libraries and information services that focuses on economic sustainability – similarly to a recent Ithaka Report.<sup>49</sup> Academic libraries could easily adopt already well established sustainability assessment tools used in higher education.<sup>50</sup> Research on the feasibility of transplanting the most suitable assessment tools from campuses into academic libraries still needs to be carried out. In 2008, Primary Research Group published a national survey of academic, public and special libraries on energy use and conservation practices. Results of the survey could allow cross-organizational comparison and assessment of library energy use and conservation.<sup>51</sup> In the future, data from this survey could be instrumental for research on establishing needed policies and programs for academic libraries in regards to energy use and conservation practices.

Overall, this category of literature focuses on environmental performance indicators that measure the use of non-renewable and renewable resources for achieving sustainable growth. There is considerable room for libraries to contribute to this literature and practice.

The four presented topics characterizing the literature on library sustainability treat their respective foci separately. Consequently, different practices (greening libraries, designing green

buildings, supporting sustainable collections and measuring progress) are inadequate separately to guide libraries toward sustainable progress. In this article sustainability progress for academic libraries is synonymous with fiscally responsible, environmentally and socially acceptable growth that limits waste and thus enables equal and long-term access to library services and information resources for current and future users. Therefore, there is a need for an integrated and comprehensive framework addressing sustainability of print and digital resources and socially and environmentally responsible networking services and practices in a green library building measured by newly developed (or adapted from university and collage campuses) indicators of sustainable progress.

### **Challenges to Sustainable Future of Libraries**

Having traditionally served as central locations wherein the collection, dispersion and constant recycling of information in both physical and digital formats occur, libraries have created an economic system of cyclical longevity and sustainability by frequently borrowing instead of constantly buying information materials.<sup>52</sup> Yet, just as the era of digital and technological revolutions has made a significant impact on the mission and methods of libraries, this new era is seriously challenging the sustainable growth of libraries. Books and journal articles are no longer simply checked out, read and returned. Now, multiple users can download, print and keep the same information on multiple occasions. It is no longer enough for libraries to have print collection; instead, the expansion, creation and preservation of collections and services have taken on new meanings. The resources and commodities (water, electricity, gas, land and paper) consumed in these processes place a large burden on library budgets. This burden is in turn being passed on to users as small fees begin to add up, threatening the core library concept of free access to information.<sup>53</sup>

Some basic library principles align well with major attributes of sustainability. The American Library Association's Task Force on the Environment states that: "the three E's—economy, ecology, and equity—provide a framework for libraries and their communities to explore and anticipate how the choices they make today affect tomorrow."<sup>54</sup> These three E's are crucial to a library's operations and its ability to meet the information needs of current and future library users. There is, however, a fundamental contradiction between the three E's framework and the present blending model of academic libraries. Embedded assumptions of the continued growth of collections, services and increasing costs of buildings run headlong into the requirement of sustainability. The balance between core sustainability attributes in today's digital environment and the tradition of continued growth and the substantial environmental consumptions that growth requires is the critical challenge academic libraries face today.

### **Libraries as Environmental Consumers**

Libraries consume enormous quantities of energy for user services and comfort, content creation and preservation. They produce considerable waste particularly in energy, water computer paper and used electronic equipment.<sup>55</sup> According to the report *Environmental Trends and Climate Impacts: Findings from the U.S. Book Industry*, more than 30 million trees are cut down annually for production of books sold in United States.<sup>56</sup> In this so-called "paperless society" the average American uses over 660 pounds of paper annually.<sup>57</sup> Michael Kanellos writes, "Xerox says that 44.5 percent of documents are printed for one-time use and 25 percent of all documents printed get recycled the same day. Lyra Research estimates that 15.2 trillion pages get printed worldwide a year, a figure that will grow 30 percent over the next 10 years."<sup>58</sup> Also Donella Meadows stresses the fact that "[t]he average American pays \$20 a year in taxes to support public libraries and can save that much by borrowing

instead of buying just one or two books. A book that is loaned 10 times cuts not only cost but paper use per read by a factor of 10.<sup>59</sup> While many libraries deliberately and conscientiously recycle, this alone does not alleviate the problem. Continued library growth enlarges their “ecological footprint.” Unless both operational costs and environmental waste are reduced in the long-term, the continuous expansion of collections and services could reduce access to information to a limited number of people.

Additionally, electronic and hazardous waste is growing drastically causing a major disparity between the goals of library sustainability and the reality of their daily operations and services. Every library shipping room constantly receives new books, periodicals, interlibrary loan orders, publisher catalogs, approval plan slip orders, correspondence and a variety of other mail. Furthermore, each library throws away weeded and unneeded print books, government documents, magazines, newspapers, bound periodicals, microfiche, junk mail, office computer paper and general waste. As the number of digital projects and networking functions escalates, libraries are faced with increasing energy costs, as well as the need to recycle unwanted equipment, obsolete computers, CDs, disks drives and used computer paper.

Indicators measuring libraries as environmental consumers regarding used computer paper, water, electricity, or ink must be developed or adopted from already existing university practices. Libraries have not crafted such indicators to track their progress toward reducing the social, economic and environmental impacts of solid and hazardous waste and energy use. Creating or adopting already developed university campus indicators<sup>60</sup> could assess economic, environmental and social performance of libraries producing budget savings and the environmental impact. These indicators should provide data on:

- The amount of water used annually by an average academic library

- The amount of solid and hazardous waste generated annually by an average academic library
- Cost reduction effected by reducing energy, water and paper use
- Percentage of daily library shipments received that end up in garbage bins
- Percentage of publisher catalogs produced on recycled paper
- Quantity of computer paper used per library employee and user
- The amount of energy used per staff member and user
- Use of environmentally friendly inks, cleaners and recycled paper
- Paper and equipment recycling rates
- Level of printing fees and other taxes imposed upon the users. Are these methods in line with the library's mission of free and open access to information?
- "Ecological footprint" of the average academic library<sup>61</sup>

Reporting metrics on academic libraries' social, economic and environmental performances would help them to understand their environmental impact and encourage the development and improvement of socially, economically and environmentally responsible operations and services.

### **Need for Sustainable Growth**

Terry Link believes that only through sustainability and environmental education can higher education be transformed and saved from commercialization, and that by participating in the creation of a sustainable future, libraries can again be "the heart of the learning communities."<sup>62</sup> Evolving information and communication technologies, growing information needs of users and growing operational costs of libraries create imbalances, and have pushed libraries towards a more commercialized model that is goal-oriented, but lacks long-term sustainable development planning. While libraries continue to thrive by meeting the information needs of their users, behind the scenes

the story is different: hidden costs of library operations, buildings, collections, equipment and supplies are growing and beginning to impact broader library goals. The traditional model of public academic libraries—to keep information open and free to all—is becoming more complicated.

Academic libraries can no longer ignore the impact of environmental consumption on their future growth. Sharing resources, rather than unnecessary duplication and consumption has shaped the library economic model. However, this model does not account for growing environmental consumption and waste. The ACRL's 2007 proposed Environmental Scan, which focused mainly on sustainable library collections and services, is insufficient for sustainable growth.<sup>63</sup> Additionally, the role of libraries in supporting global sustainability by promoting and disseminating literature on this topic and providing environmental information literacy needs to be institutionalized so that libraries can themselves become sustainable organizations adopting a model of economic progress which recognizes users' equity and shrinks libraries' "ecological footprint."

### **Sustainable Strategies for Academic Libraries**

Changing the library into an organization more attuned to present and future users is at the heart of achieving sustainable library growth. For students, information literacy is critical; for faculty it is support for their personal research and teaching. Unfortunately, the focus on sustaining and preserving collections at all costs is compromising libraries' chances for social, economic and ecologically smart growth. Balancing library innovation and adaptation to this new circumstance is an important requirement for organizational sustainability. Today organizational innovation is driven by information and communication technologies focusing less on hierarchical control of organizations and more on building sophisticated networks of collaboration and knowledge sharing. Accordingly, libraries should think less in terms of places and more in terms of spaces.<sup>64</sup> Those spaces must invite

and encourage casual and planned gatherings to play, explore, test, share, collaborate and learn both formally and informally.<sup>65</sup> Spaces can be virtual as well as real: virtual spaces are more open to networking than physical places. Boundaries fade in importance as nodes and connections emerge and become dominant in the new, open-system networked universe. Current thematic focus on preservation, print and digital collections and networking services signal that in today's reality libraries cannot be responsible only for sustaining the collection and services but also must consider the relationship between space design and economic, social and environmental sustainability.

A final requirement of sustainable organizations is the assessment of and strong interactive relations with patrons and stakeholders. Libraries are complex organizations and they flourish by providing services others require. Any assessment of meeting sustainability objectives requires hard data, not educated guesses. This in turn requires that metrics need to be developed or adopted and implemented into daily operations. Libraries gather extensive data about services provided and can learn to better utilize that data to monitor progress toward meeting their sustainability objectives. Crafting new or adopting already existing metrics for tracking library performance in sustaining collections and services is at the top of our 'to do' list for the future. In this list a plan for creating a range of sustainability indicators is needed. Such indicators would allow libraries to evaluate their current operational models in terms of economic feasibility, social equity and environmental impact to support scholarship and learning. All these measures must go well beyond the perceptions and satisfaction levels of patrons or learning outcomes assessments that dominate current evaluation practices. It is a moral imperative for libraries to become sustainable organizations not only in the sense of sustaining their collections and services but also in becoming more aware of the need to "green" their buildings and operations, reduce their "ecological footprint", and assure a better strategic

position for meeting future challenges.

## **Conclusion**

Academic libraries have always been central components of universities. With universities and colleges developing and adopting sustainability indicators, academic libraries remain slow to either develop their own sustainability indicators or to adopt indicators already developed by other organizations. Such indicators could become the basis for developing a comprehensive sustainability framework helping to assess the impacts of library operations and future projects on the library's sustainable progress. More specifically, such a framework could help libraries choose socially responsible vendors and publishers and help to evaluate operational strategies resulting in providing environmentally friendly products, energy savings, reduction of waste and keeping usage fees as low as possible. All libraries strategic plans need to be grounded in the overarching framework combining the three standard dimensions (social, economic and environmental) of sustainable growth. Sustainable strategies need to be integrated into a platform for guiding future decisions about collections, library buildings, and the scale of preservation, digitalization, equipment, products and library networking service efforts. Such decisions need to take into account not only the cost of collection, equipment and labor, but also the cost of generated waste measured by the size of the "ecological footprint" resulting from library operations and services. Library sustainability must become a strategic consideration balancing the assumptions of continued growth and expansion.

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