

OSSERVATORIO

Searching for library's economic sustainability in bookshelves: the multidimensional role of circulation analysis

by Leonidas Papachristopoulos, Akrivi Athanasopoulou, Ioanna Seferli, Maria Hadjinicolaou

Introduction

Evolution is an inherent characteristic of libraries, affecting all dimensions of their operation and infrastructure. Physical spaces, workflows, human capital, and content resources are among the elements that continuously expand, mature, or undergo transformation. In this context, Ranganathan's fifth law «the library is a growing organism» remains highly relevant almost a century after its formulation¹. Such an evolutionary trajectory must be guided by a well-structured strategic plan to ensure smooth and sustainable operation. The fulfillment of a library's mission should be pursued in a manner that does not compromise its long-term economic stability, environmental impact, or social role. The concept of library sustainability, encompassing these interrelated dimensions, emerged in the late 1960s². Since then, scholarly literature on the topic has expanded con-

LEONIDAS PAPACHRISTOPOULOS, Department of Archives, Library Science and Museology, Ionian University, Corfu, Greece lpapachr@ionio.gr

AKRIVI ATHANASOPOULOU, Hellenic open university distance library and Information center, Patras, Greece, e-mail: athanasopoulou@eap.gr

IOANNA SEFERLI, Hellenic open university distance library and information center, Patras, Greece, e-mail: seferli@eap.gr

MARIA HADJINICOLAOU, Hellenic Open university distance library and information center, Patras, Greece, e-mail: hadjinicolaou@eap.gr

Last website consultation: May 29, 2026.

1 David Mcmenemy, *Ranganathan's relevance in the 21st century*, «Library review», 56 (2007), n. 2, p. 97-101, DOI: 10.1108/00242530710730268.

2 Gary Shaffer, *Sustainability: what does it mean for you and for your library?* In: *The emerald handbook of modern information management*. Bingley: Emerald Publishing Limited, p. 227-258.

AIB studi, vol. 66 n. 1 (gennaio/aprile 2026), p. 121-136. DOI 10.2426/aibstudi-14223

ISSN: 2280-9112, E-ISSN: 2239-6152 - Copyright © 2026 Leonidas Papachristopoulos, Leonidas Papachristopoulos, Akrivi Athanasopoulou, Ioanna Seferli, Maria Hadjinicolaou



siderably^{3,4}, prompting professional associations and networks to develop guidelines⁵ and establish dedicated working groups⁶.

The present research approaches the concept of sustainability from an economic perspective, emphasizing the role of printed material circulation statistics. The analysis of such data should be regarded as a form of cost-benefit assessment that plays a critical role in strategic decision-making within libraries⁷. The outcomes of this analytical process can influence multiple operational domains, including acquisition policies⁸, spatial planning and development⁹, and human resource management.

This study is based on the analysis of circulation data derived from Hellenic open university (HOU) Distance library and information center. The institution is the primary distance higher education provider in Greece and operates as a financially self-sufficient organization, covering its expenses through tuition fees and research funding. This financial structure necessitates heightened vigilance regarding the library's economic sustainability, as the protective framework of stable government funding is absent.

This financial independence may foster an environment of institutional managerial flexibility; however, it also raises concerns regarding financial sustainability, as the institution is highly dependent on tuition fees. As Bahrs and Siedler¹⁰ note, tuition fees have a negative effect on high school students' intentions to pursue higher education. Consequently, the viability of a non-publicly funded university is closely tied to favorable or unfavorable economic conjunctures. Moreover, Pouta-

3 Leonardo Ensslin [et al.], *Sustainability in library management in higher education institutions: a bibliometric analysis*, «International journal of sustainability in higher education», 23 (2022), n. 7, p. 1685-1708, DOI: 10.1108/IJSHE-07-2021-0302.

4 Mia Høj Mathiasen; Henrik Jochumsen, *Libraries, sustainability and sustainable development: a review of the research literature*, «Journal of documentation», 78 (2022), n. 6, p. 1278-1304, DOI: 10.1108/JD-11-2021-0226.

5 American library association, *Sustainability in libraries: a call to action*, 2022, <https://www.ala.org/sites/default/files/aboutala/content/SustainabilityInLibraries_Briefing_Final_April2022.pdf>.

6 EBLIDA, *ELSLA - Expert group european libraries and sustainable development implementation and assessment - European bureau of library information and documentation associations*, 2022, <<http://www.eblida.org/about-eblida/expert-groups/eu-libraries-sustainable-development-implementation-assessment.html>>.

7 Qiana Johnson, *Moving from analysis to assessment: strategic assessment of library collections*, «Journal of library administration», 56 (2016), n. 4, p. 488-498, <<https://www.tandfonline.com/doi/abs/10.1080/01930826.2016.1157425>>, DOI: 10.1080/01930826.2016.1157425.

8 Victoria Koger; Virginia Kay Williams, *Evaluating purchase plans for niche collecting areas*, «Library resources & technical services», 67 (2023), n. 4, p. 113, <<https://alajournals.pkppso1.publicknowl-edgeproject.org/index.php/lrts/article/view/8136>>, DOI: 10.5860/lrts.67n4.113.

9 Robyn M. Gleasner, *Clear the floor: one library's approach to the removal and integration of items from two print journal collections*, «Library resources & technical services», 67 (2023), n. 2, p. 13.

10 Michael Bahrs; Thomas Siedler, *University tuition fees and high school students' educational intentions*, «Fiscal studies», 40 (2019), n. 2, p. 117-147, <<https://onlinelibrary.wiley.com/doi/full/10.1111/1475-5890.12185>>, DOI: 10.1111/1475-5890.12185.

nen¹¹ argues that higher education is increasingly shaped by both international and national competitiveness. Whereas higher education institutions (HEIs) traditionally emphasized social sustainability, current economic pressures¹² are driving a shift toward greater economic efficiency¹³.

The absence of stable governmental funding necessitates the maximization of existing institutional resources and the rational acquisition of new ones. The library under study (HOU's library) inherently shares the parent institution's concerns regarding financial viability while simultaneously striving to meet the needs of its user community. Given the nature of the institution it serves—a distance learning university—the development of digital collections is a strategic priority, as it supports a geographically dispersed population. Nevertheless, this focus does not preclude the development of printed collections, which continue to serve local users and those who have not fully transitioned to digital reading practices. Indeed, research indicates that a substantial user community remains committed to printed materials even when physical access to the library is limited¹⁴.

This research aims to identify trends in the use of printed materials in order to support the reallocation of library resources with regard to (a) material format (digital versus print), (b) content, (c) storage and hosting requirements, and (d) processing needs. The findings are expected to reveal similarities and differences in collection use between traditional and distance libraries. As Chadwell¹⁵ noted at the beginning of the 2010s, sustainability dilemmas continue to preoccupy library management, as shrinking budgets increasingly necessitate the adoption of sustainable approaches to collection management and development.

Bibliographic review

The vision of a fully electronically accessible library has not yet been fully realized, despite significant progress in this direction. Libraries of the 21st century require a form of 'creative reorganization,' as a complete transition to the digital environment—particularly with regard to content—remains unattainable¹⁶. Consequently, the analysis of printed collection use continues to be a timely and relevant issue.

11 Mikko Poutanen, *Competitive knowledge-economies driving new logics in higher education - reflections from a Finnish university merger*, «Critical policy studies», 17 (2023), n. 3, p. 390-408, <<https://www.tandfonline.com/doi/full/10.1080/19460171.2022.2124429>>, DOI: 10.1080/19460171.2022.2124429.

12 Azaddin Salem Khalifa, *Student-as-aspirant: strategic implications for business education*, «European business review», 21 (2009), n. 2, p. 172-190, DOI: 10.1108/09555340910940169/FULL/PDF.

13 Lucill Curtis; Martin Samy, *Investigating whether UK business schools need to be more business-like in order to survive in today's dynamic environment*, «International journal of educational management», 28 (2014), n. 6, p. 728-750, DOI: <https://doi.org/10.1108/IJEM-08-2013-0133>.

14 Olugbade Oladokun, *Information seeking behavior of the off-campus students at the university of Botswana: a case of two satellite centers*, «Journal of library administration», 50 (2010), n. 7, p. 883-898, <<https://www.tandfonline.com/doi/abs/10.1080/01930826.2010.488988>>, DOI: 10.1080/01930826.2010.488988.

15 Faye A. Chadwell, *What's next for collection management and managers?: sustainability dilemmas*, «Collection management», 37 (2012), n. 1, p. 3-8, <<https://www.tandfonline.com/doi/abs/10.1080/01462679.2012.633322>>, DOI: 10.1080/01462679.2012.633322.

16 Mark Dahl, *Unlocking capacity as academic libraries transition from print to digital*, «Advances in library administration and organization», 34 (2015), p. 153-175, DOI: 10.1108/S0732-06712015000034007/FULL/EPUB.

This raises an important question: why does a process that is fundamental to library operations remain crucial and exert multidimensional effects? The analysis of circulation data for printed collections should not be confined to fulfilling accounting or reporting requirements; rather, it should be treated as a strategic tool that enhances decision-making in the context of finite financial resources. Johnson¹⁷ emphasizes that such analyses play a key role in shaping libraries' strategic priorities. Similarly, Kelly and O'Gara¹⁸ argue that collection evaluation can be conducted either through a systematic and iterative process—reflecting an established organizational culture—or on an ad hoc basis to address specific and emerging needs.

Ensslin et al.¹⁹, in their literature review on library sustainability, identify several actions that library administrations should undertake to ensure long-term financial sustainability. These include securing stable financial resources, optimizing the acquisition and use of materials, developing reports on implemented sustainability actions, and prioritizing the acquisition of digital content. Conversely, Düren, Landøy, and Saarti²⁰ emphasize that libraries have long operated under persistent financial pressure, underscoring the need for strategic approaches that directly influence budget formulation. Libraries are currently operating in a transitional phase, shifting from traditional budget allocation models toward more rigorous control of expenditures.

It is important to note that librarians are not always directly involved in financial decision-making processes related to budgeting. Khan and Bhatti²¹ highlight that the role of Library and Information Science (LIS) professionals in library financial management is often limited, a situation that generates considerable concern within the profession. In many cases, librarians assume a supportive role, preparing analytical and decision-support materials that are subsequently submitted to higher administrative levels for final decision-making.

Although Ensslin et al. strongly encourage the prioritization of digital material acquisition, this approach is not always fully feasible in practice. Wilson, Hooper, Simpson, and Slay (2020), in their comparative study of printed and electronic material use in an academic library, concluded that both formats remain necessary. Their findings indicate that users alternate between printed and digital resources depending on the purpose they seek to fulfill, covering both research and leisure

17 Qiana Johnson, *Moving from analysis to assessment: strategic assessment of library collections*, «Journal of library administration», 56 (2016), n. 4, p. 488-498, <<https://www.tandfonline.com/doi/abs/10.1080/01930826.2016.1157425>>, DOI: 10.1080/01930826.2016.1157425.

18 Madeline Kelly; Genya O'Gara, *Collections assessment: developing sustainable programs and projects*, «Serials librarian», 74 (2018), n. 1-4, p. 19-29, <<https://www.tandfonline.com/doi/pdf/10.1080/0361526X.2018.1428453>>, DOI: 10.1080/0361526X.2018.1428453.

19 Leonardo Ensslin [et al.], *Sustainability in library management in higher education institutions: a bibliometric analysis*, «International journal of sustainability in higher education», 23 (2022), n. 7, p. 1685-1708, DOI: 10.1108/IJSHE-07-2021-0302.

20 Petra Düren; Ane Landøy; Jarmo Saarti, *New public management and libraries: a success story or just an excuse for cost reduction*, «Library management», 38 (2017), n. 8-9, p. 477-487, <<https://www.emerald.com/insight/content/doi/10.1108/LM-01-2017-0005/full/html>>, DOI: 10.1108/LM-01-2017-0005.

21 Ghalib Khan; Rubina Bhatti, *An analysis of collection development in the university libraries of Pakistan*, «Collection building», 35 (2016), n. 1, p. 22-34, DOI: <https://doi.org/10.1108/CB-07-2015-0012>.

needs. Similarly, Rose-Wiles²² questioned whether printed books are 'dead' and, based on usage statistics from an academic library, argued that print and electronic materials should coexist in a complementary manner. Low usage rates of printed materials were primarily associated with subject area and publication date.

Furthermore, Yuan, Van Ballegoie, and Robertson²³ emphasized that the availability of content in both print and digital formats does not necessarily signal a shift in reading habits toward digital media. Instead, usage preferences are shaped by specific needs related to research, teaching, and learning. Other studies suggest that disciplinary affiliation is a decisive factor in format choice, with researchers in the humanities demonstrating a stronger preference for printed materials²⁴. Consequently, libraries are still required to balance investments across both formats. However, the use of library resources is not determined solely by trends, shifts in reading behavior, or situational factors such as the pandemic. From a managerial and business-oriented perspective, libraries are increasingly encouraged to adopt marketing practices to stimulate user interest and enhance the utilization of library resources and services²⁵.

It is increasingly evident that the development of circulation analysis reports is more imperative than ever in supporting demand-driven acquisition models²⁶. Walton and Bunderson²⁷ analyzed circulation data to inform future purchasing decisions for printed materials, emphasizing that user behavior may have been significantly influenced during the pandemic period. Similarly, Koger and Williams²⁸ argue that collection acquisition plans should not rely solely on qualitative indicators, such as awards or reviews, but must also incorporate statistical evidence. Decision-making in library collection development should therefore be grounded in multifactorial analysis. Driven by budget constraints, Attebury²⁹ evaluated the effectiveness of the University

22 Lisa M Rose-Wiles, *Are Print books dead? An investigation of book circulation at a mid-sized academic library*, «Technical services quarterly», 30 (2013), n. 2, p. 129-152, <<https://www.tandfonline.com/action/journalInformation?journalCode=wtsq20>>, DOI: 10.1080/07317131.2013.759496.

23 Weijing Yuan; Marlene Van Ballegoie; Jennifer L. Robertson, *Ebooks versus print books: format preferences in an academic library*, «Collection management», 43 (2018), n. 1, p. 28-48, DOI: 10.1080/01462679.2017.1365264.

24 Shih Chuan Chen, *Exploring the use of electronic resources by humanities scholars during the research process*, «Electronic library», 37 (2019), n. 2, p. 240-254, DOI: 10.1108/EL-08-2018-0170/FULL/PDF.

25 Aurelia Jeremia; Kelefa Mwantimwa, *Marketing hybrid library collections and services: competencies, perceived impact and challenges*, «Journal of academic librarianship», 48 (2022), n. 4, p. 102556, DOI: 10.1016/j.acalib.2022.102556.

26 Leonardo Ensslin [et al.], *Sustainability in library management in higher education institutions: a bibliometric analysis*, «International journal of sustainability in higher education», 23 (2022), n. 7, p. 1685-1708, DOI: 10.1108/IJSHE-07-2021-0302.

27 Rebecca A. Walton; Jenica Bunderson, *Measuring the past to guide the future: takeaways from a retrospective disciplinary analysis on print books and ebooks*, «Collection management», 46 (2021), n. 2, p. 80-90, DOI: 10.1080/01462679.2020.1841701.

28 Victoria Koger; Virginia Kay Williams, *Evaluating purchase plans for niche collecting areas*, «Library resources & technical services», 67 (2023), n. 4, p. 113, <<https://alajournals.pkppso1.publicknowledgeproject.org/index.php/lrts/article/view/8136>>, DOI: 10.5860/lrts.67n4.113.

29 Ramirose Ilene Attebury, *Are patrons using the research books? A new approach to approval plan assessment*, «Collection and curation», 41 (2022), n. 2, p. 47-49, DOI: 10.1108/CC-01-2021-0002.

of Idaho Library's approval plan and found that, out of 9,433 acquired titles over a three-year period, only 112 were loaned more than four times, while the majority (6,415 titles) remained unused on library shelves. A subject-based analysis of the most frequently borrowed titles revealed that core research materials and essential textbooks continue to attract the greatest user interest. Additionally, Davis and Foss³⁰ examined interlibrary loan usage data from remote users to inform acquisition decisions. Nevertheless, even in the absence of extensive quantitative usage data, qualitative evaluation remains a valuable complementary approach to collection assessment³¹.

This paper presents an analysis of circulation data from HOU's library printed collection, with the aim of highlighting the importance of this method for libraries' economic sustainability. Specifically, the study examines – through circulation data analysis – the proportion of titles that have been loaned at least once in order to (a) inform the development of a demand-driven acquisition policy, (b) support the formulation of a communication strategy to promote underutilized materials, and (c) provide insights into staffing and storage requirements of HOU's library. All three dimensions are widely recognized as critical challenges in contemporary library management³². Overall, this work emphasizes the role of circulation analysis as a key decision-support tool within library management. The remainder of the paper is structured as follows. Section 2 reviews related literature on library sustainability and users' reading behavior. Section 3 outlines the methodological framework applied in the study. Section 4 presents the results, while Section 5 discusses the findings and links them to future strategic directions aimed at ensuring the library's economic viability and the effective use of its resources.

Methodology

The present study focuses on the analysis of circulation data from the HOU's library printed collection. The primary objective was to determine the proportion of book titles that had never been requested and to identify their thematic categories. The dataset was derived from the exploitation of HOU's library system, an Integrated Library System (ILS) that forms part of a central infrastructure called ILSaS serving the majority of Greek academic libraries. Accordingly, the administration team of the consortium was contacted to provide circulation data extracted from the central database.

Specifically, two electronic files were requested and received: one containing records of printed materials that had been loaned and another containing records of printed materials that had never been loaned. Both files included the following data fields: title, publication date, Dewey Decimal Classification number, subject headings, and document language. Non-loaned materials outside the scope of the

30 Valrie Davis; Michelle Foss, *Supporting the distance learning community with interlibrary loan and collection management at the university of Florida libraries*, «Journal of library & information services in distance learning», 3 (2009), n. 2, p. 55-66, <<https://www.tandfonline.com/doi/abs/10.1080/15332900902976701>>, DOI: 10.1080/15332900902976701.

31 Qiana Johnson, *Moving from analysis to assessment: strategic assessment of library collections*, «Journal of library administration», 56 (2016), n. 4, p. 488-498, <<https://www.tandfonline.com/doi/abs/10.1080/01930826.2016.1157425>>, DOI: 10.1080/01930826.2016.1157425.

32 Murtaza Ashiq; Shafiq Ur Rehman; Ghulam Mujtaba, *Future challenges and emerging role of academic libraries in Pakistan: A phenomenology approach*, «Information development», 37 (2021), n. 1, p. 158-173, <<https://journals.sagepub.com/doi/full/10.1177/0266666919897410>>, DOI: 10.1177/0266666919897410.

study—such as institutional collections (BSc, MSc, and PhD theses), printed journals, reference works (e.g., encyclopedias and dictionaries), and audiovisual materials (CD-ROMs and DVD-ROMs)—were excluded from the dataset. By June 2022, a total of 36,074 bibliographic records had been collected, of which 17,927 were excluded based on the above criteria.

Further processing of the dataset was required to analyze publication date, language, and subject coverage of non-loaned printed materials. The subject heading field proved unsuitable for direct analysis, as many headings were not drawn from a controlled vocabulary and others were system-generated, reflecting the consortium-based nature of the ILS. To address this limitation, the Dewey Decimal Classification was used as the primary subject indicator. Records were first grouped at the decimal level and subsequently at the hundred-level classification, enabling thematic categorization of both loaned and non-loaned titles. Additionally, materials were categorized by publication date, grouped by decade, and by document language.

Overall, the final dataset covering the period 2017-2022 consisted of:

- 8,745 loaned titles
- 17,021 non-loaned titles

Analysis

The first and most significant finding of the analysis is that 66.08% of the titles have never been loaned. As described in the methodology section, thematic categorization of the printed collection was based on the Dewey Decimal Classification. Figure 1 presents the percentage of non-loaned titles by Dewey category, revealing that 'Philosophy and Psychology' exhibits the lowest proportion of non-loaned books.

The analysis further indicates that circulation within the 'Religion' category is concentrated on a very limited number of titles. Of the 561 titles held in this category, 71.47% have never been requested by users. This finding suggests that the curriculum in Orthodox Christian Theology, which this collection supports, may encourage reliance on a restricted set of core readings or may not sufficiently motivate students to explore alternative information resources when completing assignments. More specifically, the recommended bibliographies provided for coursework appear to dominate student use, implying either a strong dependence on a narrow range of titles or a limited awareness among faculty of the breadth of available library holdings. This result contrasts with the findings of Lincoln³³, who reported that reading practices in Theology and Religious Studies remain strongly oriented toward printed materials.

In contrast, although 'Social Sciences' represents the largest subject category in terms of volume, it still exhibits a high proportion of non-loaned titles (64.80%). More broadly, the analysis demonstrates that subject categories with the narrowest title ranges—particularly 'Religion' and 'General Topics'—tend to display the highest percentages of non-loaned materials.

The analysis was further extended through a more detailed subdivision of Dewey categories into subcategories. Figure 2 presents the percentage of non-loaned printed materials according to this finer classification, highlighting the subcategories that encompass the largest number of titles. Subcategory 150-159 ('Psychology') exhibits the lowest proportion of non-loaned titles (56.57%), whereas subcategory 270-279

33 Timothy Dwight Lincoln, *Reading and e-reading for academic work: patterns and preferences in theological studies and religion*, «Theological librarianship», 6 (2013), n. 2, p. 34-52, <<https://serials.atla.com/theolib/article/view/2309>>, DOI: 10.31046/tl.v6i2.293.

(‘History of Christianity’) records the highest percentage of non-loaned material (78.44%). Notably, subcategories 680-689 (‘Manufacture of products for specific uses’) (20 titles) and 670 (‘Manufacturing’) (9 titles) show complete circulation, as all titles within these ranges have been loaned. In addition, subcategories 060-069 (‘General organizations and museum science’) and 710-719 (‘Area planning and landscape architecture’) also demonstrate relatively high levels of use. Specifically, the percentage of non-loaned material is 52.13% for subcategory 060-069 and 55.17% for subcategory 710-719.

An analysis of collection use based on publication date reveals a clear preference for more recent material. Books published prior to 1960 constitute a very small proportion of the collection and therefore do not allow for meaningful inference. Focusing on materials published after 1960, a clear inverse relationship emerges between publication age and circulation: the older the material, the lower its use. Titles published between 1960 and 1979 exhibit a non-loan rate of approximately 82%, with percentages steadily declining across subsequent decades, reaching 57.63% for publications from 2010-2019.

During the COVID-19 period, the library continued its acquisition activities, adding 120 new titles to its collection. These materials appear to have been under-utilized, with a non-loan rate of 65.57%, a pattern consistent with the broader trends observed in earlier periods. This reduced usage is plausibly attributed to the fact that these acquisitions occurred during a period of library closures and restricted access, which significantly affected user behavior. As library operations have since returned to normal conditions and as these materials support newly established academic programs, usage levels are expected to increase. The anticipated growth in demand is likely to be driven by curricular requirements, which will direct users toward the library’s collections to fulfill their academic assignments.

Dewey category	Total titles	Percentage of non-loaned titles
000 - 099 = General Works, Computer Science & Information	1555	70,03%
100 - 199 = Philosophy & Psychology	1127	59,89%
200 - 299 = Religion	561	71,47%
300 - 399 = Social sciences	9174	64,80%
400 - 499 = Language	1888	63,71%
500 - 599 = Science	2488	70,65%
600 - 699 = Technology	3335	66,80%
700 - 799 = Arts & recreation	1780	65,61%
800 - 899 = Literature	2071	66,06%
900 - 999 = History & Geography	1799	66,75%

Figure 1 - Percentages of non-loaned titles per DDC

categories

	Non-loaned titles	Loaned	Total	Percentage of non-loaned titles
000-009	880	356	1236	71.19%
150-159	224	172	396	56,57%
270 -279	91	25	116	78,44%
330-339	1753	750	2503	70,03%
410-419	384	245	629	61,04%
510-519	823	307	1130	72,83%
650-659	1094	640	1734	63,09%
700-709	269	165	434	61,98%
880-889	749	370	1119	66,93%
930-939	493	283	776	63,53%

Figure 2 - Percentage of non-loaned titles in the most populous subdivisions of the Dewey

This study also explored the role of publication language as a potential barrier to circulation. The user community of the institution under study is highly heterogeneous, and it is likely that a portion of users may not be sufficiently proficient in foreign languages. As expected, the library’s collection consists predominantly of Greek-language titles (60.73%), followed by English-language titles (33.75%).

An analysis of non-loaned titles by language reveals notable differences. Materials published in Spanish—the fourth most common language in the collection (1.52%)—exhibit a particularly high percentage of non-loaned titles (81.37%). In contrast, German-language titles account for 1.37% of the collection and show a comparatively lower proportion of non-loaned material (67.70%). Examination of loaned titles by language further indicates that these figures exclude books distributed directly to students by the institution itself. Consequently, the observed circulation patterns are based solely on titles that accompany, rather than constitute, the core student textbook packages. As presented in Figure 4, the findings suggest a clear preference among Greek students for reading materials published in their native language, underscoring the influence of language on circulation behavior.

It should be noted that HOU’s library does not maintain a formal written policy or set of procedures governing the acceptance of donated materials. Nevertheless, books donated by users and friends of the library are evaluated according to their relevance to the academic curricula offered by the institution. Of the 8,610 donated titles accepted into the collection, 4,789 titles (55.62%) have never been used. This proportion is comparatively encouraging, as it falls below the overall percentage of non-loaned material in the collection (66.08%).

A similarly high rate of non-use (66.7%) is observed within the literature collection. While the usage rate of donated materials appears more favorable than that of materials acquired through established institutional acquisition processes, these findings underscore the need for the development of a clear and formal donation

policy. Finally, the analysis of the library’s literature collection indicates that the majority of titles remain unused, suggesting that users of a distance learning institution’s library primarily engage with the collection for educational rather than recreational or literary purposes.

<i>Decade</i>	<i>Non-loaned titles</i>	<i>Loaned titles</i>	<i>Percentage of non-loaned titles</i>
<i>[N/A]</i>	384	17	95.76%
<i>1890-1899</i>	1	0	100%
<i>1900-1909</i>	200	59	77.22 %
<i>1910-1919</i>	1	0	100
<i>1920-1929</i>	4	1	80%
<i>1930-1939</i>	13	3	81.25%
<i>1940-1949</i>	23	1	95.83%
<i>1950-1959</i>	11	11	100%
<i>1960-1969</i>	243	51	82.65%
<i>1970-1979</i>	805	173	82.31%
<i>1980-1989</i>	1305	531	71.07%
<i>1990-1999</i>	4326	2267	65.61%
<i>2000-2009</i>	7697	4168	64.87%
<i>2010-2019</i>	1880	1382	57.63%
<i>2020-2022</i>	120	63	65.57%

Figure 3 - Percentages not loaned by decade of publication

<i>Language</i>	<i>Non-loaned titled</i>	<i>Loaned titles</i>	<i>Total</i>	<i>Percentage of non-loaned titles</i>
<i>spa</i>	319	73	392	81,37%
<i>eng</i>	6647	2049	8696	76,43%
<i>fre</i>	453	154	607	74,62%
<i>ita</i>	30	11	41	73,01%
<i>ger</i>	239	114	353	67,70%
<i>gre</i>	9308	6340	15648	59,48%

Figure 4 - Percentages of non-loaned titles by language

Discussion

As Walton and Bunderson³⁴ aptly state, ‘we measure the past to guide the future.’ Libraries must systematically assess demand for the materials included in their printed collections in order to formulate informed roadmaps for future activity. Libraries serving distance learning institutions, such as the one examined in this study, operate under heightened uncertainty. Distance learning universities do not enroll a fixed number of students annually; demand for services fluctuates and, when combined with the absence of stable state funding, creates an environment of financial precariousness. Consequently, libraries supporting such institutions must continuously measure material demand and actively stimulate usage to maximize the value of their collections. Circulation analysis can support management in planning strategies related to (a) the promotion of collection titles, (b) collection development, and (c) donation acceptance policies.

The analysis of circulation data from the library under study indicates relatively limited coverage of its printed collection. The proportion of loaned titles is considerably lower than that reported in comparable studies³⁵, a finding that should be interpreted in light of the geographically dispersed nature of the user community. Indeed, the results confirm the intuitive assumption that distance libraries experience lower levels of printed material use compared to traditional campus-based libraries, where physical proximity plays a crucial role in circulation patterns. In the post-pandemic era, libraries must also remain attentive to potential shifts in user behavior toward printed books. While the preceding period may have served as a benchmark in the transition toward a fully electronic library, definitive conclusions regarding this transformation require further investigation. Until such evidence becomes available, the library examined in this study should continue to assess its circulation data iteratively, ensuring that its printed collection evolves in ways that effectively respond to the needs of its user community.

Based on the preceding analysis, close cooperation between teaching staff and library professionals is essential in order to strengthen the role of the library within the educational process and to ensure that bibliographies proposed by instructors are adequately represented in the library’s collection. The existing range of titles appears to be largely underutilized, which may be attributed either to repetitive assignment themes or to faculty members’ limited familiarity with the breadth of the library’s holdings. Another possible explanation is the infrequent revision of recommended bibliographies by teaching staff. In this context, library use can be viewed as a reflection of teaching practices in distance education. An overreliance on specific thematic directions and prescribed supporting materials leaves little room for broader engagement with the library’s collection.

While libraries cannot intervene directly in the teaching process, instructors should foster a culture of independent exploration by encouraging students to go beyond prescribed reading lists. It should be emphasized during instruction that recommended bibliographies are indicative rather than restrictive. Since library usage

34 Rebecca A. Walton; Jenica Bunderson, *Measuring the past to guide the future: takeaways from a retrospective disciplinary analysis on print books and ebooks*, «Collection management», 46 (2021), n. 2, p. 80-90, <<https://doi.org/10.1080/01462679.2020.1841701>>, DOI: 10.1080/01462679.2020.1841701.

35 Weijing Yuan; Marlene Van Ballegoie; Jennifer L. Robertson, *ebooks versus print books: format preferences in an academic library*, «Collection management», 43 (2018), n. 1, p. 28-48, <<https://doi.org/10.1080/01462679.2017.1365264>>, DOI: 10.1080/01462679.2017.1365264.

mirrors teaching practices in higher education, institutions serving distance learners—where independent study is a core principle—should actively promote the use of materials discovered through students' own research efforts rather than relying exclusively on faculty-selected resources.

At the same time, the library itself must capitalize on its communication channels to promote materials that users may be unaware are available. A promotional campaign for new acquisitions via social media, titled *Book of the Week* is already underway. This initiative not only informs users about newly acquired titles but also highlights the parallel development of the library's print and digital collections. Such dissemination efforts should be further strengthened through regular newsletters and the creation of a dedicated section on the library's website. As Papachristopoulos³⁶ notes, marketing issues have been largely neglected in distance library-oriented literature. Consequently, libraries serving distance education institutions should adopt promotional practices commonly employed by traditional libraries to enhance the visibility and use of their collections.

Conversely, during the acquisition process, lecturers should recommend materials to which they intend to direct students. The supply of printed library materials should correspond to actual instructional demand. Recommended bibliographies must align with the library's holdings; otherwise, the library's role and reputation may be compromised, as it could be perceived as failing to ensure adequate access to information for its users. In this context, circulation analysis can function as an advisory tool for academic departments, supporting evidence-based acquisition strategies.

Furthermore, accepted donations should be limited primarily to materials in Greek and English, as these languages appear to be preferred by the library's users. Although the university offers programs in English, French, Spanish, and German, circulation data indicate that users tend to meet their informational needs in foreign languages through non-print resources. While donated materials can be valuable during periods of financial constraint, they should not be regarded as a cost-free solution³⁷. The rejection of donations may occasionally have negative repercussions for a library's public image³⁸; therefore, the establishment of a formal donation acceptance policy is essential to protect both the institution's reputation and staff workload. A clear policy based on defined criteria would enable effective management of donor expectations. As Cardozo aptly notes, «while most donors wish to help libraries, they may not realize that their gifts can be a burden. ... We must be honest about what we need, manage donor expectations, and protect the time and dignity of all library personnel»³⁹.

36 Leonidas Papachristopoulos [et al.], *Desperate times call for desperate measures: a comparative analysis of services between traditional and distance libraries in covid-19 era*, «Journal of library and information services in distance learning», 17 (2023), n. 1-2, p. 1-14, <<https://doi.org/10.1080/1533290X.2023.2190316>>, DOI: 10.1080/1533290X.2023.2190316.

37 Mieke Lietaer, *Please give generously! Handling donations to libraries*, «Art libraries journal», 33 (2008), n. 4, p. 33-38, DOI: 10.1017/S0307472200015601.

38 Kay Ann Cassell, *Handling gift books in libraries: a view from the US*, «New library world», 106 (2005), n. 9-10, p. 450-453, DOI: 10.1108/03074800510623128.

39 Paula Cardozo, *Dealing with unwanted donations: a content analysis of small academic canadian library webpages*, «Partnership: the canadian journal of library and information practice and research», 17 (2022), n. 1, p. 1-19, DOI: 10.21083/partnership.v17i1.6300.

To enhance collection development, it is recommended that a subject-specialist librarian collaborate closely with teaching staff to ensure that acquired materials align with curricular needs⁴⁰. Such collaboration allows for the integration of pedagogical requirements with the library's financial constraints. Evidence suggests that materials recommended by the library's user community achieve higher circulation rates⁴¹ (Tyler et al, 2012). Moreover, recognizing the librarian's autonomous role as a collection development manager contributes positively to the effective management of print collections. Regardless of the evaluation model employed, acquisition decisions should be grounded in a balanced cost-use relationship and aligned with sustainable budgeting principles. As Nixon and Lehner-Quam⁴² observe, «users and scholars say they want the printed book, but rather than walk across the street to get it they use the ebook⁴³. Consequently, all stakeholders involved in acquisition decisions must ensure that materials added to the library's OPAC demonstrate a realistic potential for use.

In this challenging task of collection development, artificial intelligence can play a significant role. At a primary level, it can optimize the allocation of resources⁴⁴ and identify patterns in material usage⁴⁵, which may lead to improved recommendations for users. Circulation data alone can serve as a foundation for decision-making regarding collection development, while also functioning as key input for the application of machine learning techniques that support the achievement of the overall objective. Artificial intelligence techniques can also bridge the gap between understanding the requirements of academic syllabi and the materials available in institutional libraries⁴⁶. Therefore, any lack of collaboration between faculty members and library staff can, to some extent, be addressed probabilistically through emerging technological advancements.

40 Kay Downey, *Why did we buy that? new customers and changing directions in collection development*, «Collection management», 38 (2013), n. 2, p. 90-103, <<https://www.tandfonline.com/doi/abs/10.1080/01462679.2013.763741>>, DOI: 10.1080/01462679.2013.763741.

41 David C. Tyler [et al.], *Patron-Driven acquisition and circulation at an academic library: interaction effects and circulation performance of print books acquired via librarians' orders, approval plans, and patrons' interlibrary loan requests*, «Collection management», 38 (2013), n. 1, p. 3-32, <<https://www.tandfonline.com/doi/abs/10.1080/01462679.2012.730494>>, DOI: 10.1080/01462679.2012.730494.

42 Scott Nicholson, *A conceptual framework for the holistic measurement and cumulative evaluation of library services*, «Journal of documentation», 60 (2004), n. 2, p. 164-182, DOI: 10.1108/00220410410522043.

43 Paula Cardozo, *Dealing with unwanted donations: a content analysis of small academic canadian library webpages*, «Partnership: the canadian journal of library and information practice and research», 17 (2022), n. 1, p. 1-19, DOI: 10.21083/partnership.v17i1.6300.

44 Ugochukwu Francis Ikwuanusi [et al.], *Leveraging AI to address resource allocation challenges in academic and research libraries*, «IRE journals», 5 (2022), n. 10, p. 1-13.

45 Shahnaz Khademizadeh; Zahra Nematollahi; Farshid Danesh, *Analysis of book circulation data and a book recommendation system in academic libraries using data mining techniques*, «Library and information science research», 44 (2022), n. 4, p. 101191, <<https://doi.org/10.1016/j.lisr.2022.101191>>, DOI: 10.1016/j.lisr.2022.101191.

46 Néstor A. Nova [et al.], *Advancing library operations with AI: data-driven insights for academic resource management*, «Information research», 30 (2025), p. 105-120, DOI: 10.47989/ir30CoLIS52261.

Conclusion

The COVID-19 pandemic transformed the delivery of education, profoundly affecting all supporting structures, including libraries. Higher education institutions were compelled to operate remotely, and their libraries were similarly forced to adapt the ways in which services were delivered⁴⁷. As a result, many traditionally campus-based libraries were placed in a distance library context, prompting management to recognize the specific characteristics and distinct collection development requirements associated with remote user communities. This study underscores the necessity of systematically analyzing circulation data in distance libraries in order to effectively serve a demanding and heterogeneous audience through the lens of sustainability. In the post-COVID era, many libraries will be required to reassess their service models, as distance education increasingly becomes a normalized mode of learning. A thorough understanding of distance library needs will better position libraries to respond to emerging challenges.

Future research should focus on a more granular analysis of circulation patterns, including usage rates of loaned materials and hold rates at the item level. Such analysis would help identify weaknesses in collection development strategies, particularly in cases where high-demand titles require the acquisition of additional copies to adequately meet user needs. This approach would suggest a strategic shift toward increasing collection depth rather than breadth. Furthermore, detailed subject analysis of the most frequently loaned titles could reveal patterns related to the depth of knowledge each title provides. An important question to explore is whether basic research texts and core instructional materials constitute the most heavily used resources in open university libraries⁴⁸. The findings of such research would offer valuable insights into the institutional identity of open education providers, shedding light on whether open universities function primarily as hubs of knowledge dissemination or as centers of knowledge creation.

Limitations

That reliance on quantitative usage data alone may not be sufficient for fully informed decision-making. Effective collection development policies should therefore combine circulation metrics with qualitative insights in order to capture the complexity of user needs across disciplines. Such an integrated approach would support more responsive, balanced, and sustainable collection strategies in the context of ongoing shifts between print and digital resources.

⁴⁷ Leonidas Papachristopoulos [et al.], *desperate times call for desperate measures: a comparative analysis of services between traditional and distance libraries in COVID-19 era*, «Journal of library and information services in distance learning», 17 (2023), n. 1-2, p. 1-14, DOI: 10.1080/1533290X.2023.2190316.

⁴⁸ Ramirose Ilene Attebury, *Are patrons using the research books? A new approach to approval plan assessment*, «Collection and curation», 41 (2022), n. 2, p. 47-49, DOI: 10.1108/CC-01-2021-0002.

Articolo proposto il 16 gennaio 2026 e accettato il 29 maggio 2026.

ABSTRACT AIB studi, 66 n. 1 (gennaio/aprile 2026), p. 121-136. DOI 10.2426/aibstudi-14223
ISSN: 2280-9112, E-ISSN: 2239-6152 - Copyright © 2026 Leonidas Papachristopoulos,
Leonidas Papachristopoulos, Akrivi Athanasopoulou, Ioanna Seferli,
Maria Hadjinicolaou

LEONIDAS PAPACHRISTOPOULOS, Department of Archives, Library Science and Museology, Ionian University, Corfu, Greece lpapachr@ionio.gr
AKRIVI ATHANASOPOULOU, Hellenic open university distance library and Information center, Patras, Greece, e-mail: athanasopoulou@eap.gr
IOANNA SEFERLI, Hellenic open university distance library and information center, Patras, Greece, e-mail: seferli@eap.gr
MARIA HADJINICOLAOU, Hellenic Open university distance library and information center, Patras, Greece, e-mail: hadjinicolaou@eap.gr

Alla ricerca della sostenibilità economica della biblioteca tra gli scaffali: il ruolo multidimensionale dell'analisi della circolazione

Lo scopo di questa ricerca è mettere in evidenza il ruolo dell'analisi dei dati di circolazione nel sostegno alla sostenibilità finanziaria delle biblioteche accademiche. Poiché il passaggio completo a un ambiente esclusivamente elettronico non è ancora stato realizzato, la natura ibrida delle biblioteche contemporanee mantiene vivo l'interesse per la circolazione dei materiali a stampa. Sulla base dei dati di circolazione della biblioteca di un'istituzione di istruzione a distanza (Hellenic Open University (HOU) Distance Library and Information Center), lo studio mira a individuare i titoli con un basso o nullo utilizzo ed esaminare in che modo fattori quali l'anno di pubblicazione e la lingua influenzino i modelli di circolazione. Un'analisi approfondita delle statistiche di circolazione della collezione a stampa rivela una serie di criticità multidimensionali legate allo sviluppo della collezione. Tra queste rientrano, tra l'altro, la ristrutturazione dei modelli di acquisizione, la collocazione fisica del dipartimento centrale della biblioteca, l'istituzione di nuove sedi, le esigenze di organico e la definizione di efficaci politiche di promozione della collezione. L'analisi dei dati di circolazione non dovrebbe essere considerata soltanto come un mezzo per soddisfare requisiti contabili, bensì come uno strumento strategico a supporto di decisioni informate. Attraverso un'analisi sistematica della circolazione, il ruolo del bibliotecario viene rafforzato, configurandolo sia come responsabile della collezione sia come attore chiave nella sostenibilità finanziaria della biblioteca. Poiché la pandemia ha costretto molte biblioteche a operare come istituzioni di apprendimento a distanza, i risultati derivati dall'analisi della circolazione in un contesto di biblioteca a distanza presentano una rilevanza e un'applicabilità più ampie.

Searching for library's economic sustainability in bookshelves: the multidimensional role of circulation analysis

The purpose of the present research is to highlight the role of circulation analysis in supporting the financial sustainability of academic libraries. As the full transition to an exclusively electronic environment has not yet been achieved, the hybrid nature of contemporary libraries sustains ongoing interest in the circulation of printed materials. Drawing on circulation data from a distance learning institution's library (Hellenic Open University (HOU) Distance Library and Information Center), the study seeks to identify titles with low or no usage and to examine how factors such as publication date and language influence circulation patterns.

A comprehensive analysis of the printed collection's circulation statistics reveals multidimensional issues related to collection development. These issues concern, among others, the restructuring of acquisition models, the physical location of the library's central department, the establishment of new branches, staffing considerations, and the formulation of effective collection promotion policies.

Circulation data analysis should not be viewed solely as a means of fulfilling accounting requirements, but rather as a strategic tool that supports informed decision-making. Through systematic circulation analysis, the role of the librarian is enhanced, positioning them as both a steward of collections and a key contributor to the library's financial viability. Given that the pandemic compelled many libraries to operate as distance learning institutions, the findings derived from circulation analysis in a distance library context are of broader relevance and applicability.