GEORGIA'S PUBLIC LIBRARIES

ESTIMATED SERVICE VALUATION AND ECONOMIC IMPACT 2018

GEORGIA PUBLIC LIBRARY SERVICE

ACKNOWLEDGMENTS

The librarians and other staff members at Georgia's 406 public libraries provide outstanding and valuable services to the state's residents. They help educate, entertain, and improve the lives of Georgians of every age. The Carl Vinson Institute of Government thanks the Georgia Public Library Service for assistance in providing the data needed for the analysis in this report. We especially thank Julie Walker, Wendy Cornelisen, and Whitney Payne of the Georgia Public Library Service for initiating this study and answering the many questions that came up during the analysis.

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INTRODUCTION

The Georgia Public Library Service (GPLS) is the state library administrative agency and a unit of the Board of Regents, University System of Georgia. GPLS provides innovative, scalable library technology and services; staff training and best practices; grant administration; and more to create equity in the library experience for patrons, no matter where they live. The organization also works with elected officials to ensure they understand the critical role that libraries play in meeting the immediate and long-term needs of citizens. Libraries have been serving their communities since at least the 7th century BCE in the city of Nineveh in what was the Assyrian Empire (present day Iraq). Libraries were among the first public organizations in the American colonies, beginning as early as 1731 with the Library Company of Philadelphia founded by Benjamin Franklin.[1]

Today, Georgia's public libraries are learning centers that empower their community members to achieve their goals at any stage of life. Libraries have reimagined their spaces, collections, and services to meet their community's needs. Many libraries partner with local organizations to provide innovative services, from donating library garden produce to address local food insecurity to leading job search workshops at area homeless centers. Groups gather at the library to discuss books, learn STEM (science, technology, engineering, and mathematics) skills, and much more. Public library services extend beyond the library walls to be integrated into the communities they serve as well as online. Growth in the variety of materials and the dedication of resources to functions that did not exist a mere two decades ago, or were minor compared to current offerings, suggests that consumers demand more from today's libraries.

GPLS asked the University of Georgia's Carl Vinson Institute of Government to evaluate the economic impact of the state's public libraries and to estimate the value of services received by the citizens of the state in return for the dollars provided in the form of budget allocations from state and local governments, and grants from the state and federal governments. The 406 individual libraries in the state are called "outlets," whether the facility is a main library or branch library. The 63 administrative units are called "systems" and oversee the operation of between one and 34 outlets. This study evaluates services provided at all outlets across the state using both outlet and system data provided by GPLS for 2018, the last year complete data were available.

A note about this report and similar analyses produced elsewhere is in order. Over the last decade, several cost-benefit analyses of library services conducted by university research units and private-sector consulting firms have been commissioned by state library systems. In

[1] American Library Association: www.ala.org/aboutala/before-1876

reviewing these studies, researchers at the Institute of Government noted several methodological approaches that have been used for the task. The research team also identified a variety of problems with the techniques used in some of those studies. In many instances, researchers have either overvalued services or, worse, double-counted services. The studies reviewed present cost-benefit ratios with a low of about $4 to a high of more than $8. That is, the researchers report that for every dollar invested in the state's libraries, the public receives services with a value of between about $4 and $8. Some studies double-count by adding the value of library services to the budget used to produce them. This is like stating that the value of a gallon of milk is $6 — $3 in actual value plus the $3 it costs to purchase the milk.

In one otherwise reasonably done study, researchers estimated the library system's economic output (the value of the services produced) using an input-output model, then valued the services using contingent valuation and summed the two figures. This is like measuring a distance in yards and in meters, then summing the two. The researchers should have included only the value added to the economy indirectly and through an induced effect from the input-output model. The Institute of Government research team endeavored to avoid such errors and provide a reasonable and accurate estimation of economic impacts and valuation of the services provided by Georgia's libraries.

DATA AND METHODOLOGY

The data used in this study were provided by GPLS in two databases. The first consists of data collected on the 63 systems that include funding amounts and sources, expenditure amounts and purposes, number of staff, and data on resources (books, computers, videos, etc.) and service levels (circulation, programming, downloaded items, etc.) summed from outlet data for each system. The second file contains data on the 406 outlets and includes information on the buildings, resources, the numbers of users with library cards, service levels, and volunteers who donate their time to the library. The Institute of Government research team organized the data into a relational database so that additional economic and demographic data could be used in parts of the analysis. These data came from georgiadata.org and include information at the county level from the US Census Bureau, the Bureau of Labor Statistics, the Bureau of Economic Analysis, and other sources.

This study has three analytical components. The first part evaluates the financial resources provided to Georgia's library systems and estimates the value of services. Since libraries do not engage in market transactions, the research team used a technique known as contingent valuation to estimate the value of services provided to library users. Contingent valuation is a method of estimating the value that a user would likely be willing to pay for a service. This valuation can be made by adopting the market value of a similar or substitutable good or

service, by surveying people to determine the price they would be willing to pay for a service, or by assigning a value to the time needed to perform a task. The specific techniques used for valuing each service are discussed in the next section.

The second analytical component is an economic impact analysis using the libraries' staffing and payroll data. Traditional input-output (IO) economic impact analysis measures not only the direct impact of employment (library staffing) but also economic transactions that occur in the supply chain (indirect employment) because of the direct economic activity. Impact analysis also includes economic activity that occurs when employees in the direct and indirect jobs spend their salaries and wages. This is known as an induced effect. As alluded to in the introduction, the Institute of Government researchers conducted the IO analysis to estimate the indirect and induced economic impacts associated with public libraries in the state.

These first two analytical components are used to present a cost-benefit analysis. The benefits include the value of services to library patrons and the value added to the Georgia economy indirectly and through an induced effect. The cost-benefit analysis is an estimation of benefits produced per unit of cost, in this case financial resources.

Finally, the report presents an evaluation of some of the determinants of library usage across the state. This analysis sheds light on why library services are more heavily used in some communities or parts of the state than in others. The Institute research team hopes that this analysis will help inform the allocation of resources for more efficient library services.

FINANCIAL RESOURCES FOR LIBRARIES IN GEORGIA

Georgia's county and municipal governments provide funding for libraries in two ways. Many local governments make budget allocations to their local outlets to support operations. Those funds are used for staffing, programming, building maintenance, and other general expenses. Sometimes in addition to or in lieu of a general contribution, local governments designate the purpose of funds such as to pay salaries, wages, and benefits; for purchasing materials for the library; for specific one-time expenditures; or for regular operating expenses. In addition to support from local governments, libraries generate some revenue from fees, fines, and donations which amounted to about $11 million statewide in 2018 and is included in the first column in Table 1. The total for all local funding in 2018 was $174,493,833.

State grants and other state funds provided to public libraries for maintenance of effort (not including funding for capital projects) totaled $33,153,273 in 2018. Libraries also received

$339,627 in federal funds either through small grants provided by GPLS or from federal agencies such as the US Department of Agriculture.[2]

The Georgia General Assembly also provided $3,185,279 in funding for the operation of the central offices of GPLS and $12,686,000 in bond proceeds to fund capital projects, major repair and renovation grants, and technology grants. In addition to the $339,627 in federal grants that went to specific outlets, $4,104,639 in federal dollars were used to fund operations of the central offices of GPLS. Total funding for the operation of Georgia's 406 libraries in 2018 was $227,962,651, with an average funding amount per outlet of $561,484. The totals do not match perfectly with the amounts reported by GPLS in its *By the Numbers* report for 2018, but the sum is close to the total of $228,899,822 reported there.[3]

[2] GPLS received a total of $4,444,266 in federal grants in 2018. Most of those funds provided statewide benefits for all libraries.

[3] See georgialibraries.org/statistics_files/GPLS_By%20the%20Numbers_FY2018.pdf.

Table 1. Library Funding by Source for All 63 Administrative Systems (in $US)

System	Local Government Support and Other Local Revenue	State Grants and Other Support	Federal Funds	System Total
Athens Regional Library System	3,653,748	1,016,173	1,018	4,670,939
Atlanta Fulton Public Library System	26,843,758	1,747,051		28,590,809
Augusta–Richmond County Public Library System	2,649,595	489,951		3,139,546
Bartow County Library System	1,581,698	267,862		1,849,560
Bartram Trail Regional Library System	517,446	383,014		900,460
Brooks County Public Library	136,665	152,689		289,354
Catoosa County Library	580,836	192,864		773,700
Chattahoochee Valley Libraries	7,324,567	759,662	3,032	8,087,261
Chattooga County Library System	237,371	140,729	4,303	382,403
Cherokee Regional Library System	784,888	430,331	14,691	1,229,910
Chestatee Regional Library System	858,516	269,850		1,128,366
Clayton County Library System	4,012,624	554,338		4,566,962
Coastal Plain Regional Library	1,046,950	681,466	8,250	1,736,666
Cobb County Public Library System	12,032,018	1,300,797	3,887	13,336,702
Conyers–Rockdale Library System	1,114,485	244,763		1,359,248
Coweta County Public Library System	2,147,026	315,506		2,462,532
De Soto Trail Regional Library System	302,822	1,186,950		1,489,772
Dekalb County Public Library	20,265,652	413,369	3,625	20,682,646
Dougherty County Public Library	2,546,027	254,178	4,020	2,804,225
Elbert County Public Library System	184,566	140,475		325,041
Fitzgerald–Ben Hill County Library	281,107	131,836		412,943
Flint River Regional Library System	3,560,677	1,016,471		4,577,148

System	Local Government Support and Other Local Revenue	State Grants and Other Support	Federal Funds	System Total
Forsyth County Public Library	6,109,735	478,280		6,588,015
Greater Clarks Hill Regional Library	3,120,217	631,942		3,752,159
Gwinnett County Public Library System	18,016,006	1,462,920	3,458	19,482,384
Hall County Library System	2,547,820	435,796		2,983,616
Hart County Library System	152,752	136,576		289,328
Henry County Library System	2,691,084	453,034		3,144,118
Houston County Public Library	947,469	394,914		1,342,383
Jefferson County Library System	287,244	169,240		456,484
Kinchafoonee Regional Library System	420,338	417,539		837,877
Lake Blackshear Regional Library System	669,261	494,296		1,163,557
Lee County Public Library	916,310	150,632		1,066,942
Live Oak Public Libraries	9,258,644	962,736		10,221,380
Marshes of Glynn Libraries	862,493	294,178	3,913	1,160,584
Middle Georgia Regional Library System	3,619,700	957,010	224,406	4,801,116
Moultrie–Colquitt County Library System	589,953	169,444		759,397
Mountain Regional Library System	793,101	334,896		1,127,997
Newton County Library System	1,037,881	270,487		1,308,368
Northeast Georgia Regional Library System	1,475,434	572,950		2,048,384
Northwest Georgia Regional Library System	1,265,552	655,130		1,920,682
Ocmulgee Regional Library System	449,739	666,978		1,116,717
Oconee Regional Library System	900,625	637,758		1,538,383
Ohoopee Regional Library System	365,317	524,055		889,372
Okefenokee Regional Library System	573,181	644,579		1,217,760
Peach Public Libraries	315,824	142,577		458,401

System	Local Government Support and Other Local Revenue	State Grants and Other Support	Federal Funds	System Total
Piedmont Regional Library System	2,011,025	518,931		2,529,956
Pine Mountain Regional Library System	623,156	478,196		1,101,352
Roddenbery Memorial Library	402,834	151,328		554,162
Sara Hightower Regional Library System	1,859,328	402,857		2,262,185
Satilla Regional Library System	299,341	270,214	50,000	619,555
Screven-Jenkins Regional Library System	385,499	240,616		626,115
Sequoyah Regional Library System	3,875,460	790,312		4,665,772
South Georgia Regional Library	1,266,747	498,270		1,765,017
Southwest Georgia Regional Library System	864,422	523,966	4,419	1,392,807
Statesboro Regional Public Libraries	1,609,783	856,997		2,466,780
Thomas County Public Library System	1,100,543	166,770		1,267,313
Three Rivers Regional Library System	1,358,598	837,825	3,215	2,199,638
Troup–Harris Regional Library	924,570	364,724		1,289,294
Twin Lakes Library System	541,560	225,216	3,311	770,087
Uncle Remus Regional Library System	2,094,117	949,150		3,043,267
West Georgia Regional Library	5,023,213	1,593,100	4,079	6,620,392
Worth County Library System	204,915	136,529		341,444
Subtotal	**174,493,833**	**33,153,273**	**339,627**	**207,986,733**
Georgia Public Library System		3,185,279	4,104,639	7,289,918
Capital, Facilities, and Technology				12,686,000
Total 2018 Funding				**227,962,651**

Source: Georgia Public Library Service

SERVICE METRICS AND VALUATION

In-Library Assistance

At just about any grade level from elementary school to college, a first stop for students seeking information is the reference desk or reference librarian. One of the key services offered to users by librarians is help finding information or using the library's resources. As noted in the previous section, contingent valuation requires a method of assigning a value to the service received. In this case, the most reasonable method is to value the time required to answer a library user's question or aid in using a library resource. Citing a 1998 study of reference assistance provided at a university library,[4] researchers at the University of Texas estimated the average time needed to assist library users.[5] That study divided reference assistance into categories based on time needed. About 70% of reference questions needed only one to five minutes; roughly 20% needed six to 10 minutes; nearly 8% needed 11 minutes or more; and the remaining 2% needed an unknown amount of time. A study of major university libraries in 2002 estimated that the average time spent on a reference question was seven minutes.[6] Given the consistency of these separate estimations, the Institute research team adopted the division used in the Texas study from 1998, placing the 2% of unknown duration in the first group (one to five minutes).

Although some libraries report declining requests for assistance at reference desks, others point out that the complexity of questions and the resources needed to respond have increased tremendously.[7] For example, users seeking job postings in the past typically wanted to know where and how to send a job application; now the user may request detailed statistics about the company and other information that must be gathered from additional sources. Expectations for the quick availability of comprehensive information has increased substantially in the last 20 years. This growing complexity suggests that the time spent on reference questions may have increased at university research libraries and public libraries alike.

Using the averages from the Texas study, the Institute of Government researchers divided requests for reference assistance into the categories listed in Table 2 based on the estimated time

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[4] John S. Spencer and Luene Dorsey. 1998. "Assessing time spent on reference questions at an urban university library." *Journal of Academic Librarianship* 24:4, 290–294.

[5] Bureau of Business Research IC Institute. 2017. *Texas Public Libraries: Economic Benefits and Return on Investment*. University of Texas at Austin.

[6] Eric Novotney. 2002. *Reference Service Statistics and Assessment*, SPEC Kit 268. Washington, DC: Association of Research Libraries.

[7] Judith S. Garrison. 2010. "Making reference service count: Collecting and using reference service statistics to make a difference." *The Reference Librarian* 51:3, 202–211.

needed to respond. The total number of hours needed in the first two categories is estimated by multiplying the midpoint of each category (3 minutes and 8 minutes) by the number of requests and dividing by 60. For the final category (11 minutes or more), the research team used 11 minutes, which produces a conservative estimate of the time needed for these questions. Note that the category is only 8% of all requests, so the analysis is not sensitive to the use of 11 minutes.

The total number of library reference requests reported for all systems in 2018 was 7,668,866. Three systems did not report the number of reference requests: the Atlanta–Fulton Public Library System, the Moultrie–Colquitt County Library System, and the Three Rivers Regional Library System. To estimate the requests these libraries received, the Institute researchers calculated the ratio of reference requests to library visits for the 60 systems that reported both statistics and used that ratio to produce estimates for the three systems with missing data. This results in a total of 7,720,904 requests for assistance in 2018. The average hourly wage of certified library staff statewide calculated from data provided by GPLS is $28.27 based on a 2,080-hour work year.

The total amount of time needed to respond to reference requests was 597,084 hours. At the average hourly rate, libraries across the state provided $16,879,543 in value for this service. That results in an estimated average value per request of $2.19.

Table 2. Contingent Valuation of Reference Service, All 63 Systems (2018)

Time Needed	Number of Requests	Total Time in Hours	Hourly Rate	Total Value	Value per Request
1– 5 minutes	5,559,051	277,953	$28.27	$7,857,718	$1.41
6 –10 minutes	1,544,181	205,891	$28.27	$5,820,532	$3.77
11 minutes or more	617,672	113,240	$28.27	$3,201,293	$5.18
Total	7,720,904	597,084		$16,879,543	$2.19

Totals may not sum due to rounding of the underlying data.
Source: Georgia Public Library Service, Carl Vinson Institute of Government

Programming

The state's libraries offer a wide range of events and programs for children, young adults, and adults. Each system provides a calendar on its website with information by outlet on upcoming offerings. A review of several calendars indicates that a great number of outlets offer children's story time programs in the mornings for both toddlers and preschool-age children. Young adult programs range from tutoring and test preparation to afterschool study and skills programs

(ESL, writing, math, sign language, etc.), plus well-being classes and social events (yoga, meditation, time management, various game tournaments, etc.). A great variety of adult and senior classes and workshops cover topics such as health and fitness, tax preparation, using computers and smart phones, genealogy, needlecraft, and chess, plus support groups on a variety of issues.

Many of the programs offered at libraries across the state are delivered by volunteers because they enjoy reading to children or helping students with their schoolwork, or because they have expertise on a topic or activity. As noted above, the time that volunteers spend conducting programs, classes, and workshops is a resource the library would otherwise have to obtain through the labor market, or it would be unable to offer the programming. In this section, the value of the programming is calculated as opposed to the labor donated by the volunteers.

Programming data from the 63 library systems are divided across children's programs, those for young adults, and those for adults. The number of programs and attendance are presented in Table 3. The Texas study cited previously valued children's programming at $6.50 per attendee, young adult programming at $9.50, and adult programming at $12.50. A 2010 Minnesota study reported a value per attendee of $4.32 for children's and young adult programs, and $6.48 for adult programs.[8] Inflated to 2020 dollars using the consumer price index from the Bureau of Labor Statistics, these amounts would be $5.16 and $7.74, significantly less than the figures used in the Texas study. In comparison, the American Library Association (ALA) values children's, young adult, and adult programming at $7.00, $12.00, and $15.00, respectively.[9] These amounts are about 7.6% higher for children's programs and more than 20% higher for young adult and adult programs than the Texas study. Using the amounts from the Texas study produces a total value that is more conservative than the ALA calculator but a bit more than the adjusted amounts from the Minnesota estimate. Georgia's libraries also reported figures for "all age" programming. These events have been valued at $10, slightly more than the young adult programs. Using these values per attendee, the total value of programming at the state's libraries was $21,692,947 in 2018. Two other categories of programs were reported in the outlet data as programs for non-English-speaking audiences and for special needs audiences. The data showed 2,243 and 2,013 such programs, respectively, but did not report the number of individuals who attended the programs. Thus, these are not included in the total valuation.

[8] Cited on the American Library Association website: www.ala.org/tools/research/librariesmatter/geographic-area/united-states?page=2)

[9] American Library Association Value Calculator: www.ala.org/advocacy/library-value-calculator)

Table 3. Contingent Valuation of Library Programming, All 63 Systems (2018)

Program Type	Number of Programs	Number of Attendees	Value per Attendee	Total Value
Children	48,658	1,755,682	$6.50	$11,411,933
Young Adult	9,361	227,373	$9.50	$2,160,044
Adult	29,658	385,536	$12.50	$4,819,200
All-Ages Programs	9,405	330,177	$10.00	$3,301,770
Total	97,082	2,698,768		$21,692,947

Totals may not sum due to rounding of the underlying data.
Source: Georgia Public Library Service, Carl Vinson Institute of Government

Computer and Wi-Fi Use

Anyone born after about 1985 has probably used a computer at the local library for their entire life. People much older likely remember searching for books on a topic using the card catalog, drawers full of index cards — one for each book in the library organized by topic or keyword and alphabetized by the author's last name. Computer use in libraries first replaced the card catalog system. By the 1990s, library terminals provided access to electronic databases, and today, library visitors have access to banks of computers for classes of all sorts and for individual access to the internet. The activities facilitated by local library computers include the following:

- Research
- Job search and completing job applications
- Applying for government benefits
- Travel planning
- Tax filing
- Homework
- Banking
- Seeking college financing information

Although the list of activities people use library computers for is likely much longer, the main point is that access to the internet is a critical benefit provided by libraries across the state.

In a 2012 study by the University of Texas, researchers estimated that the average library visitor used an internet-accessible computer for about 1.16 hours (approximately one hour and 10

minutes).[10] The New York Public Library allows users to reserve an internet-accessible computer for a 45-minute session with the possibility of extending that time depending on demand.[11] For this study, the Institute research team used the 1.16 hour estimate for each computer-use session.

In addition to an internet connection, most library terminals have programs such as Microsoft Office and Adobe Creative Cloud as well as specialized software for video and sound editing. Several companies provide similar services at hourly rates that can be used as a contingent valuation for internet access with a computer. At both FedEx and Staples, a computer with basic software and internet access costs $18.00 per hour. Printing is extra. If the typical user needs to print at least a few pages of material, the costs easily exceed $20 per hour. Using a computer at the local library has the added benefit of a reference librarian to assist at no additional cost as well as access to other library resources.

Wireless access sessions are much harder to estimate because users connect with their own laptop or other device. Unless a library's network logs users on, then off, and reports the average time spent, any estimate of the time spent connected via Wi-Fi is really a guess. The only data provided by GPLS are wireless sessions; no information on the length of those sessions is available. Of the 406 outlets, 269 provided data on the number of wireless sessions logged by their networks. Consistent with the method used to estimate missing data for reference assistance, the research team calculated the ratio of wireless access sessions per library visit and used that ratio to estimate sessions at nonreporting outlets. That ratio is 0.23517 sessions per visit, which seems reasonable. This suggests that one in four library visitors utilized the Wi-Fi capability.

There are market equivalents for wireless connections. Many hotels charge guests a $5 or $10 fee for Wi-Fi use, but in competitive markets, access to Wi-Fi is usually included in the room rate. Many businesses offer free Wi-Fi to customers as part of another transaction such as dining at a café or coffee shop or while having a car serviced, and they view the fee as part of doing business or attracting customers. Certainly, the marginal cost of providing the service is small. Those that charge for Wi-Fi connections typically charge a minimal fee.

Providing Wi-Fi service adds value to the experience of library users. It allows them to use their own laptop computer, which is more convenient for downloading files, saving bookmarks for web pages, and using software that may not be available on the library's computers. During

[10] Cited in the 2017 study (see footnote 5).
[11] New York Public Library website: www.nypl.org/help/computers-internet-and-wireless-access/reserving-computer

spring 2020, after many libraries shut down due to the COVID-19 pandemic, library patrons and many others could still use the Wi-Fi access, as libraries ensured coverage in their parking lots. For many K-12 students and their families, this provided a means to complete online school assignments and remain connected to their teachers and peers. This was particularly true for low-income families with no broadband service and in rural areas with limited coverage. In some communities, the local library may be the best option for broadband access at no cost.

Alternative wireless access can be obtained through a user's phone service, but that may incur additional charges. Because the only market indicators suggest a minimal fee of $5, the Institute research team used that rate for the contingent valuation of the service.

Whether using a library's computer or connecting via the library's wireless service, visitors may choose to use computers at the local library for a variety of reasons. Broadband service at their residence may be poor, nonexistent, or expensive. They may need to use other resources at the library or have access to printing capabilities. For any number of reasons, library visitors in Georgia had nearly 12.5 million computer sessions and nearly 6 million wireless sessions. Using the $15 per hour rate for computer use and $5 per wireless session, the valuation of this service across the state is more than $247 million (see Table 4).

Table 4. Contingent Valuation of Computer Use and Wireless Sessions and Estimated Value, All 63 Systems (2018)

	Sessions	Hours	Total	Rate	Total Value
Internet Accessible Computer	12,494,587	1.16	14,493,721	$15.00	$217,405,814
Wireless Session	5,986,002	–	5,986,002	$5.00	$29,930,010
Total	18,480,589	–	–	–	$247,335,824

Totals may not sum due to rounding of the underlying data.
Source: Georgia Public Library Service, Carl Vinson Institute of Government

Database Use

The use of electronic databases and collections of materials at libraries began in the 1960s with the machine-readable cataloging system (MARC) developed by the Library of Congress.[12]

[12] Michele Seikel and Thomas Steele. 2010. "How MARC has changed: The history of the format and its forthcoming relationship to RDA." *Technical Services Quarterly* 28:3, 322–334.

MARC allowed standardization of bibliographic references and sharing of resources across libraries. This first phase of database use essentially replaced the card catalog system and then periodical abstracts. These systems allowed users to search a library's holdings and find materials through interlibrary loan much more quickly. A second phase of database use provided full text of journal articles and other resources.[13] Initially, these resources were contained on CD-ROM for use in the library. Now, libraries have extensive collections of books, journals, video, music, and data resources of all types, most of which can be accessed from remote servers via subscription services. Both the American Library Association and the Association of Research Libraries publish guides and resources on building and maintaining a library's electronic collections.

Among the resources listed on several library system websites in Georgia are those for book downloads, state history and culture, and Galileo, Georgia's virtual library, an initiative of the Board of Regents of the University System of Georgia. Additional resources are available on a range of topics such as the following:

- Ancestry and genealogy
- Charitable foundations
- World culture and travel
- Language learning and instruction
- Business directories
- Legal forms and assistance
- Government publications
- Consumer reports
- Stock market data and analysis
- Practice tests and tutorials

GPLS provides 62 databases from five vendors (EBSCO, ProQuest, LexisNexis, FirstSearch, and Britannica Online) to all 63 systems in the state. Data provided by these vendors to GPLS indicate that the system received 1,123,872 searches and provided 491,504 successful document retrievals. These numbers represent retrievals from the electronic databases made available by GPLS to all libraries across the state. Of course, users of library computers also retrieve data, documents, and additional resources through other websites. The 1.1 million searches and nearly half a million document retrievals represent only part of computer use at public libraries.

[13] Diana Kichuk. 2010. "Electronic collection growth: an academic library case study." *Collection Building* 29:2, 55–64.

The American Library Association (ALA) values database searches at $2 and successful document retrievals at $19.95. Several services provide documents for a fee. Some journal publishers charge between $5 and $15 for a single document download. J-Stor provides significant free content, but many items require a monthly ($19.95) or annual ($200) subscription. The ALA valuation seems a bit high for document retrieval, but a monthly subscription to a service such as J-Stor would result in a cost of about $5 if used four times each month. GPLS subscription cost for Galileo was $1,827,476 in 2018. If one distributes that cost across 491,504 successful retrievals, each one cost $3.72. But, contingent valuation seeks to assign a value from the user's perspective, not what the service costs. Adding the value of convenience, provision of the service, and the required equipment, a valuation of $2 per search and $7.50 per retrieval seems reasonable.

Table 5 shows the total value of successful electronic data retrievals at Georgia's public libraries in 2018 to be $5,934,024. This is a conservative estimate of the value of this service and is quite a bit less than the estimate from Texas in 2017, even after considering the differences in population and the number of outlets.

Table 5. Contingent Valuation of Electronic Database Retrievals, All 63 Systems (2018)

	Total Estimated Retrievals	Value per Retrieval	Total Value
Searches	1,123,872	$2.00	$2,247,744
Retrievals	491,504	$7.50	$3,686,280
Total			$5,934,024

Totals may not sum due to rounding of the underlying data.
Source: Georgia Public Library Service, Carl Vinson Institute of Government

Circulation

Georgia's public libraries provide borrowing privileges to library patrons for many types of materials including books, videos, and music as well as a variety of downloadable files for eBooks, audio books, videos, and music.

Books are probably the first items people think of when asked about library services. Most people, regardless of age, were introduced to their local or school library for the purpose of selecting a book to read. The easiest market transaction to use for contingent valuation is the purchase of the book from a book seller. However, after reading a purchased book, there is a residual value: The purchaser owns the book. Arriving at a reasonable contingent valuation

requires separating the value of reading the book from the residual value of owning a copy that can be read again, given to a friend, or sold. Another consideration is the price demanded by a book seller for a copy. Many new books are discounted from the published price and, except for the most recent titles, may be available from a used book seller for a fraction of the original price. The ALA calculator values circulation of children's books, young adult books, and adult books at $12, $17, and $20, respectively, which seems to be about typical of prices for many new books at most book sellers. Again, used copies of many books can be purchased for a fraction of those values.

One way to approach contingent valuation is to divide the cost of a book by the number of times it might be circulated from a library. Recent best sellers might be checked out a dozen or more times in the first six months they are available from a public library. Indeed, libraries have long dealt with the problem of purchasing an optimal number of new books that are in high demand.[14] Certainly, demand declines over time, but most books, depending on the quality of the paper and binding, can be circulated dozens of times before their condition deteriorates beyond use. If one assumes that most books can be circulated even 20 to 30 times before being replaced, the fraction of the book's cost per use is extremely low.

Approaching the issue from another perspective is to estimate the actual residual value of a book once it has been read. Some books are purchased with the expectation of returning to them time after time, but the vast majority, once read, are placed on a shelf, given to a friend, sold to a used book seller, or donated. The only transactions that can be properly estimated are donations (residual value $0) or selling the book to a used bookstore. Regarding the donated value of books, some tax preparation guidelines value donated hardback books at $3 to $5 depending on condition, and paperbacks somewhat less. The actual residual value becomes that amount multiplied by the taxpayer's effective tax rate.

Used book sellers typically offer half (or less) of the price they hope to realize by reselling a volume. This is certainly the case if it is a recent best seller or classic work of literature with market demand. If a book originally sold for $20 and can be sold used for $8 or $10, the "wholesale" price offered to the original buyer might be $4 or $5. If the book has long been in print with lower demand, the price offered will be a lower percentage of the original price. This suggests that a $20 book has a residual value of around $5 at the most, so the primary value to the original buyer is in reading the book. But few buyers take a calculation of residual value into consideration when purchasing a book.

[14] Joseph P. Newhouse and Arthur J. Alexander. 1972. *An Economic Analysis of Public Library Services*. Santa Monica, CA: Rand Corporation. p. 91.

One final approach to determining a reasonable contingent valuation of book circulation is willingness-to-pay. What would a person pay to borrow a library book? Library collections serve heterogenous tastes, which is why for-profit lending libraries existed in the past. The "rich" population bought books, and "poor" consumers rented them.[15] Sharing a book through a library makes economic sense when the transaction costs of sharing are less than the marginal cost of production (of the book), or when the product is used only a few times, making ownership too expensive for most people, or when sharing makes it possible to serve people who value the service (the book) differently.[16] This suggests that willingness-to-pay varies but certainly cannot exceed a fraction of the cost of a book. Availability is not the issue it was in the past when book scarcity made for-profit lending libraries viable. Today, books are available from many brick-and-mortar outlets as well as from online sellers.

Several studies have reported results from surveys of library users on their willingness to pay for library services generally or for book lending in particular. Those results indicate a willingness to pay only a small amount. A 2001 survey in Great Britain asked library users, hypothetically, how much they would be willing to pay to borrow books they had just returned to the library. Responses indicated they were willing to pay the equivalent of only $1 or $2.[17] A second study that asked library patrons about their willingness to pay a monthly fee per household for all library services revealed that half of respondents would be willing to pay as much as $8 or $10 per month.[18] The limitations of these surveys are apparent. Asking about the hypothetical willingness to pay for something that has always been provided at no cost to the borrower is likely to illicit low values. Willingness-to-pay and value received in this situation can vary considerably.

The Texas study cited previously used an average of valuations from studies in four other states and the ALA calculator. The ALA calculator at that time (2017) placed a value of $17 on all books. The average values reported by the University of Texas researchers were $7.83 for children's' books, $8.19 for young adult books, and $10.65 for adult books. These values seem to be reasonable estimates of the value received based on market transactions for book sales, taking residual value into consideration. They are higher than amounts library users report they are willing to pay, but the objective is to estimate the value received, which is better indicated

[15] Hal R. Varian. 2009. "Buying, sharing and renting information goods." *Journal of Industrial Economics* 48:4, 473–488.
[16] Varian, 2009.
[17] Anne Morris, Margaret Hawkins, and John Sumsion. 2001. "Value of book borrowing from public libraries: user perceptions." *Journal of Librarianship and Information Science* 33:4, 191–198.
[18] Philip Hider. 2008. "Using the contingent valuation method for dollar valuations of library services." *Library Quarterly* 78:4, 437–458.

by market transactions than by responses to a survey about hypothetical willingness to pay. For this study, the Institute research team believes reasonable valuations are $7, $8, and $10, respectively, for children's books, young adult books, and adult books. Although the data provided by GPLS does not break circulation figures into the three categories, the circulation total of all children's items — books, eBooks, videos, and music — is included. The research team used the ratio of total children's circulation to total circulation to estimate the number of children's books circulated. That percentage is 43.57%, or about 11 million children's books out of a total book circulation of 25.4 million. Since it was not possible to differentiate adult and young adult books, faculty and staff used a blended value of $9 for the remaining 14 million books.

Libraries now face the issue of limitations on loaning electronic books.[19] Publishers limit the number of times an eBook may be loaned or limit the time a title may be loaned. Beyond the time allowed, a library must repurchase the title. If demand for a recent best seller is greater than the number of users that can access an eBook, the library must purchase additional licenses. This is not unlike the situation that libraries face with physical copies of books when library patrons find themselves on wait lists for an in-demand book.

Some library users prefer physical copies of books, while others have adapted to reading from electronic devices quite readily. Each has its benefits, but choosing one format over the other is a matter of personal preference. There is no reason to value reading from an electronic device differently than from a hard copy. Therefore, the analysis values eBooks the same as hard copies. Since most eBooks are used for either young adult or adult books rather than children's books, the analysis uses a blended value of $9 for eBooks.

Market transactions for video and music rentals are typically $2 to $5 from Redbox, Amazon Prime, Netflix, and other services. Many of these services provide a library of older movies and videos that are included in a basic monthly subscription price, but charge fees for 24-hour rentals of newer releases. The lower of these bounds, $2, seems a fair value for borrowing video and music offerings from the public library, whether it be a physical CD, Blu-ray disc, or downloaded file.

As shown in Table 6, the total value of book circulation is $206,751,272 for 2018. All other items, including eBooks, videos, and music (both physical items and downloaded files), add another $29,610,376 bringing the total value for these items to $236,361,648.

[19] Stanley M. Besen and Shelia Nararaj Kirby. 2014. "Library demand for e-books and e-book pricing: An economic analysis." *Journal of Scholarly Publishing* 45:2, 128–141. doi: 10.3138/jsp.45.2.002

Table 6. Contingent Valuation of Circulation, All 63 Systems (2018)

Item	Circulation	Value	Total Value
Children's Books	11,080,757	$7.00	$77,565,299
Adult/Young Adult Books	14,353,997	$9.00	$129,185,973
Book Subtotal	25,434,754		$206,751,272
eBooks	1,676,612	$9.00	$15,089,508
Video/audio	7,260,434	$2.00	$14,520,868
Total	34,371,800	–	$236,361,648

Totals may not sum due to rounding of the underlying data.
Source: Georgia Public Library Service, Carl Vinson Institute of Government

Interlibrary Loan

Interlibrary loan services make practically any item held at one library available to users at all other libraries. This service makes books and other materials that have a relatively limited demand available to local library patrons without the patron's library needing to expend financial resources to acquire them. The library obtains an item from another library on behalf of the patron for a determined period; then, it is returned to the loaning library. Items not held in any of the state's libraries can often be obtained through interlibrary loan from libraries elsewhere in the US. There is usually a fee for this service to cover the cost of mailing or shipping the item from the lending library and for sending it back.

GPLS provides a system called PINES to coordinate the lending of materials from one library to another inside the state. GPLS central administrative office has staff dedicated to the operation of PINES and provides courier service to move items between libraries. Most of Georgia's public libraries participate in the PINES system. If a library patron wants an item that is not available at her local library, the PINES system allows librarians to locate the item at another library in the system.

Because PINES and the interlibrary loan system make items not contained in a local library's collection available easily and quickly, these systems add value for library users. Having access to items that may not be available any other way is one of the unique offerings of public libraries. The value of interlibrary loan items and those obtained via the PINES system may be quite different. The PINES system moves copies of books where they are needed, either because the receiving library does not own the item or because demand is higher. The interlibrary loan system makes items available that are not held by any of the state's public libraries. In either

case, the book (or other item) is captured in the circulation statistics already valued in the previous section of this report. Here, the research team values just the service that makes the book (or another item) available. For items obtained through interlibrary loan, the value assigned is half the value of a book circulation. Since the circulation of the item is already valued at $9 in the previous section, this increases that value by 50%. The actual costs for shipping may be significantly more than $4.50. The value here is for the availability, and it is assumed the borrower also covers the cost of shipping both ways. For PINES items, a $2 value is assigned for the service.

Libraries in the 63 systems across the state reported obtaining 173,938 items through interlibrary loan and 4,894,516 through the PINES system in 2018 (Table 7). The libraries also reported loaning 276,707 items to other libraries through interlibrary loan and 4,678,444 to GPLS outlets through PINES. For the PINES system, of course, the counts of items loaned and items borrowed should be roughly equivalent, and they are close. The difference is likely due to the timing of the transactions. For this analysis, the Institute researchers included the items loaned from other libraries and the PINES items loaned from GPLS outlets, for a total value of interlibrary loan and PINES services of $10,571,753.

Table 7. Contingent Valuation of Interlibrary Loan and PINES Services, All 63 Systems (2018)

	Items Obtained	Value	Total Value
Interlibrary Loan	173,938	$4.50	$782,721
PINES	4,894,516	$2.00	$9,789,032
Total			$10,571,753

Totals may not sum due to rounding of the underlying data.
Source: Georgia Public Library Service, Carl Vinson Institute of Government

In-library Use of Materials

Many library visitors use printed materials while in the facility but do not borrow them for use outside the library. Indeed, many printed materials are not circulated and are available only for use in the library. This is often the case for recent and collected periodicals, and for rare or out-

of-print materials. However, digitization of these materials for access on database platforms is changing how users obtain some published materials.

Many of the materials library visitors use in-house are captured elsewhere in this study. The use of computer terminals and the provision of database resources was not part of the landscape in 1986 when researchers at the University of Illinois conducted a survey to determine in-library use of materials. Newspapers, printed periodicals, and reference books are still much a part of library offerings, and people use these items without the need to keep them beyond the immediate use.

Statistics on in-library use of materials are typically estimated rather than based on accurate counts. The 1986 University of Illinois study used data from a survey of 18 libraries across the US and estimated that 42 items were used in the facility for every 100 circulated.[20] They found that more than half (54%) of patrons used materials in the library whether or not they checked materials out of the library. In a 2017 report, researchers at the University of Texas cited in-library usage rates of 37.7% in 2011 and 38.4% in 2013, calculated from means for in-library use and print circulation published in the reports of the Public Library Data Surveys (PLDS) from the Public Library Association for those years. In 2014, the ratio from the PLDS, using the means, was somewhat higher at 47.2%.[21] The report did not note a change in the data collection methodology but did indicate that fewer libraries reported each of the various components of usage that year. In 2017, the ratio dropped to 15.5%. In 2014, only 879 libraries reported data for in-library use of materials whereas 1,290 did so in 2017. The consistency of the PLDS ratios reported in 2011 and 2013 (37.7% and 38.4%) with the 42% from the University of Illinois study in 1986 suggests that the 2014 and 2017 reported figures might be aberrations. However, to be conservative and to account for inconsistencies in data collection on in-library use of materials, the Institute research team used a reduced estimation of the ratio of in-library use to print circulation of 25% and valued that use at $1, in line with the value of 88 cents used by the researchers in Texas.

Taking 25% of the print book circulation (25,434,754) and valuing each use at $1 yields $6,358,689 in value for in-library use of materials.

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[20] Richard Rubin. 1986. *In-House Use of Materials in Public Libraries*. Graduate School of Library and Information Science, University of Illinois at Urbana-Champaign.

[21] Ian Reid and Carl Thompson. 2017. *The 2017 Public Library Data Service Report: Characteristics and Trends*. Public Library Association. Retrieved from publiclibrariesonline.org/2017/12/the-2017-public-library-data-service-report-characteristics-and-trends/

Special Circulation Items

Georgia's public libraries offer several special items that users may borrow. These include a family pass valid at any Georgia state park, an informational CD and pass to Zoo Atlanta, and passes to the Go Fish Education Center, the Center for Puppetry Arts in Atlanta, and the Michael C. Carlos Museum at Emory University. Library users may also check out Discovery Backpacks provided in conjunction with the State Park Pass. The backpack contains a pair of binoculars, state park information guides, and Foldout Naturalists Guides to Georgia Wildlife, Georgia Birds, and Georgia Trees & Wildflowers for exploring the parks. Georgia's libraries, like many libraries across the country, also offer one-week use of a Kill-A-Watt meter. Users plug the device into an electrical outlet, then plug any electrical appliance or device into the meter, which provides information on the amount of electricity the appliance or device uses. The meter helps users find devices that consume electricity while not in use or even after they have been turned off.

The value of the family passes to parks, museums, and other attractions is determined by the admission prices at those places. The State Park Pass is valued at $20, the $5 per person daily rate for a family of four. The Discovery Backpacks are valued at a nominal $5. The Zoo Atlanta Pass provides admission for a family of four. The cost for two adults and two children is $87.96. The Go Fish Education Center Pass covers the normal $24 cost of admission for a family of four. The Center for Puppetry Arts Passport covers museum admission for a family of four that would cost $50. Some attractions and programs at the Center for Puppetry Arts, including the build-a-puppet workshop, cost extra and are not covered by the pass. The regular admission for a family of four at the Michael C. Carlos Museum at Emory University is normally $28. The one-week use of the Kill-A-Watt meter is valued at $3.

Each library outlet reported the total number of times each item was used by a library patron during 2018 including 70,455 circulations of other electronic devices and 683,893 circulations of items not listed in the preceding categories. Notes on these data indicated such things as jewelry-making kits, sewing machines, story time and puppet packs, telescopes, portable DVD players, software, laptops, and board games. No data were available indicating how many times any specific item was checked out for use by a library patron. Due to the variation in values these items might have and the lack of data on use, the research team assigned a nominal $10 value for electronic devices and $2 value for nonelectronic items. Those figures and the total valuation are reported in Table 8.

Table 8. Special Circulation Items Valuation, All 63 Systems (2018)

Item	Number of Uses	Value	Total Value
State Park Pass	20,522	$20.00	$410,440
Discovery Backpack	6,641	$5.00	$33,205
Zoo Atlanta Pass	27,193	$87.96	$2,391,896
Go Fish Education Center Pass	1,085	$24.00	$26,040
Center for Puppetry Arts Pass	2,355	$50.00	$117,750
Michael C. Carlos Museum Pass	2,702	$28.00	$75,656
Kill-A-Watt Meter	908	$3.00	$2,724
Other Electronic Items	70,455	$10.00	$704,550
Other Items Not Included Above	683,893	$2.00	$1,367,786
Total			$5,130,047

Totals may not sum due to rounding of the underlying data.
Source: Georgia Public Library Service, Carl Vinson Institute of Government

Volunteer Hours

Libraries across the US depend on volunteers to supplement regular staff. Volunteers reshelf books and materials, register participants for special programs, and a perform a wide variety of other activities that help keep the library organized and functioning. Volunteers also reduce the amount of time that professional staff spend on these tasks, helping keep them available to assist library patrons. Georgia's libraries reported a total of 176,545 hours provided by adult volunteers and 58,099 hours from teens for a total of 234,644 hours. Based on a 2,080-hour work year, these hours represent the effort of approximately 113 persons engaged full time, an average of 1.8 persons per system. This is a significant resource providing service to Georgia's library users.

There are two ways to think about the value of volunteer hours. In one sense, these hours represent labor that the libraries received from the public, albeit from a subset of all citizens. The hours of labor are an input that the libraries consumed to provide programming and services, the same as the funding received that paid for regular staff. In this sense, the value to the public is in the programming and services produced. These things have already been valued elsewhere in this report.

Financial resources used by the libraries are furnished primarily by local governments, state grants, and a few other sources. These are provided by society collectively. Volunteer hours are provided by the individuals who donate their time and talents. Without the volunteers, libraries

would need to purchase the additional 234,644 hours from the labor market. Or the libraries would forgo delivery of the services supported by volunteers.

Another way to value volunteer hours is from society's perspective. Assuming society values the services provided by volunteers, society received the benefits without furnishing the resources needed to produce them. Only a small subset of citizens provided the volunteer hours. Viewed this way, the values assigned to services elsewhere in this report are understated. Some were received at no financial cost to citizens collectively. The analysis must include the value of volunteer hours the libraries received in 2018 as an input that was not provided by society collectively. The Bureau of Labor Statistics (BLS) valued volunteer hours at $25.43 per hour in 2018, as reported by Philanthropy News Digest.[22] For Georgia, the amount was slightly higher at $25.78. This value is based on average hourly earnings plus benefits for all production and nonsupervisory workers on private nonfarm payrolls, as calculated by the BLS. Adult volunteer hours are valued at the BLS estimate, while volunteer hours from teens are assigned 60% of the value ($15.47). Table 9 presents the estimated value of all volunteer hours.

Table 9. Volunteer Hours Valuation, All 63 Systems (2018)

	Hours	Value per Hour	Total Value
Adult Hours	176,545	$25.78	$4,551,330
Teen Hours	58,099	$15.47	$898,792
Total	234,644		$5,450,122

Totals may not sum due to rounding of the underlying data.
Source: Georgia Public Library Service, Carl Vinson Institute of Government

Meeting Room Use

Virtually all the state's public libraries have meeting rooms available for use by groups and organizations in the community. In their annual data survey for 2018, the Georgia Public Library Service did not request data on meeting room use from the state's public libraries. However, in 2019, five questions were added to the data survey asking about the number of meeting rooms and study rooms, as well as how many times they were used. Georgia's libraries reported having a total of 423 meeting rooms and 353 study rooms available for public use.

Library staff were not aware at the beginning of 2019 that the survey would include the five questions about meeting rooms and study rooms and their use, so many outlets did not collect accurate data during the year. Respondents were instructed not to provide data on meeting

[22] See philanthropynewsdigest.org/news/value-of-volunteer-time-rose-3-percent-in-2018.

room and study room use unless records had been kept that could provide reliable information. They were further instructed to include only use by outside groups and organizations, not use for library programming. All libraries reported the number of meeting rooms available, but only 262 outlets reported the number of times a meeting room was used by a community group or organization. Those 262 libraries reported that their 368 meeting rooms were used a total of 41,960 times in 2019. That is an average use of 114 times or a little more than twice per week. This number seems reasonable. One hundred forty-three libraries reported having study rooms that can be used by small groups, but only 83 reported the number of times a study room was used during 2019. These 83 libraries had an average of 2.3 study rooms available, and each was used an average of 456 times, or about eight to nine times per week.

The research team collected costs for meeting room use from a variety of facilities including the Georgia Center for Continuing Education at the University of Georgia and several other meeting and conference facilities. The team also gathered estimates from websites providing guidance for meeting organizers, including peerspace.com and contactpointe.com. Typical estimates for a meeting room to accommodate 100 people range from $100 to $250 per hour depending on the technology provided. Smaller spaces for six to eight persons range from $10 to $25 per hour. While the data collected by GPLS in 2019 did not specify the technology provided, GPLS staff indicate that virtually all meeting rooms at libraries have technology available. It is reasonable to assume that most groups would need projection equipment and, in some cases, a computer with presentation software such as PowerPoint. To be conservative, the values used are $100 per use for meeting rooms and $10 for study rooms; these are on the low side of estimates from the sources consulted. GPLS data do not indicate the average length of time a meeting room or study room is occupied.

Using statistics from the 2019 data survey, the research team estimated 2018 meeting and study room use under the assumptions that the average uses per room for reporting libraries in 2019 is consistent with both the population as a whole and uses per room in 2018. The data in Table 10 show that the estimated value provided by the state's libraries in 2018 to community groups, organizations, and students was an estimated $6.4 million in 2018.

Table 10. Estimated Meeting and Study Room Use and Valuation, All 63 Systems (2018)

	Number	Annual Uses per Room	Total Uses	Value per Use	Total Value
Meeting Rooms	423	114	48,222	$100.00	$4,822,200
Study Rooms	353	456	160,968	$10.00	$1,609,680
Total	776		209,190		$6,431,880

Totals may not sum due to rounding of the underlying data.
Source: Georgia Public Library Service, Carl Vinson Institute of Government

Total Valuation of All Services

The total valuation of GPLS services using contingent valuation and the other estimation methods discussed in the preceding sections is $562,146,476. Table 11 contains the complete list of services that were monetized in this analysis.

Table 11. Valuation of Quantifiable GPLS Services, All 63 Systems (2018)

Service	Total Valuation
Reference Services	$16,879,543
Programming	$21,692,947
Computer/Wireless Connection	$247,335,824
Database Retrieval	$5,934,024
Circulation	$236,361,648
Interlibrary Loan/PINES	$10,571,753
In-Library Use of Materials	$6,358,689
Special Item Circulation	$5,130,047
Volunteer Hours	$5,450,122
Meeting Room Use	$6,431,880
Total	$562,146,476

Totals may not sum due to rounding of the underlying data.
Source: Carl Vinson Institute of Government

INPUT-OUTPUT ECONOMIC IMPACT ANALYSIS

Input-output (IO) modeling measures total economic activity associated with a single input to the economy. In this study, the input to the Georgia economy is employment at public libraries. That economic activity associated with direct employment produces indirect impacts as libraries purchase materials, building services (maintenance, repair, janitorial, etc.), office supplies, and other goods and services. The direct and indirect employment associated with library activity provides income for the households of those employees. When those employees spend their salaries and wages, additional jobs are supported in the broader economy through an induced effect. These jobs are largely in retail, restaurants, and a wide variety of professional, skilled, and nonskilled service industries.

Institute of Government researchers used IMPLAN, a widely accepted IO county-based model of the US economy, to determine the impact of GPLS on Georgia's economy. IMPLAN models economic impacts for activities in more than 500 industry sectors. However, local government operations are divided into education and non-education components, neither of which provides a sector spending pattern for the types of goods purchased by libraries. Economists at IMPLAN suggested using the sector "business support services" as a proxy for modeling public libraries and then adjusting the parameters to eliminate business profits in the results, which also reduces estimated taxes. The Institute research team ran the model twice using different specifications and got similar results: first using business support services and second using the sector "business management."

The impacts shown in Table 12 were obtained using business support services. The 3,644 jobs and labor income data for 2018 came from system data reported by GPLS.

Table 12. Estimated Economic Impacts from Public Library Employment, 2018

Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	3,644	$144,177,329	$112,277,091	$266,185,832
Indirect Effect	804	$46,408,563	$69,783,639	$124,020,479
Induced Effect	1,149	$54,102,892	$100,936,471	$173,475,112
Total Effect	5,597	$244,688,784	$282,997,201	$563,681,424

Totals may not sum due to rounding of the underlying data.
Source: IMPLAN, Carl Vinson Institute of Government

The 3,644 direct jobs at public libraries in the state support an additional 1,953 jobs, for a total of 5,597 statewide. The labor income associated with all employment supported by the libraries is nearly $245 million. Direct output is about $266 million, a good bit higher than the actual spending reported by GPLS of $216.2 million.[23] Note that this figure is not truly an estimate of the value of the libraries' output because the analysis is using as a proxy the private industry sector, one that produces very different output but has similar indirect and induced impacts.

Some explanation of the terms "value added" and "output" is in order. Value added is the sum of labor income, business profits, and taxes collected on behalf of government. This is the amount that recirculates longest in the state's economy. Output is the total value of all goods and services produced because of the direct economic activity. Total output ($563.7 million) is like gross national product (GDP) at the national level.

Two issues must be considered when incorporating an estimate of economic impact into the cost-benefit analysis. The first is whether to use value added or output. To understand the difference between these two measures of economic impact, consider what each means. If a local firm purchases $100 worth of inputs (raw materials and labor) to make a product that it sells for $150, the economic activity has not added $150 to the local economy. It has produced $150 of output, but the economy does not benefit by that amount. Value added, on the other hand, is what was paid in labor, plus profit ($50 in this simple example), and any taxes paid in conjunction with the transactions that occurred. To avoid the error of counting output rather than the contribution to the state's economy, the Institute research team used value added.

A second consideration is whether to include the total value-added figure ($282,997,201) or only some components of that figure. On the cost side of the cost-benefit analysis, the Institute researchers presented in Table 1 the financial resources provided to GPLS, including amounts from local, state, and federal sources. Those amounts were used to pay staff salaries and purchase all the other goods and services needed by the outlets across the state. Including value added from the direct effect line of Table 12 would add the cost of labor back into the analysis as a benefit, negating the cost incurred and overstating the ratio of benefits to costs. To avoid this error, the only figures included in the cost-benefit analysis that follows are the indirect and induced impacts from the value-added column, a total of $170,720,110. Adding this figure to the monetized value of library services (the total in Table 11) yields a total of $732,866,586.

[23] GPLS By the Numbers. 2018. Retrieved from georgialibraries.org/statistics_files/GPLS_By%20the%20Numbers_FY2018.pdf

COST-BENEFIT ANALYSIS: RATIO OF BENEFITS TO COSTS

The total revenues for Georgia's 63 public library systems in 2018 was $227,962,651 as presented in Table 1. If only the estimated value of services produced by public libraries ($562,146,476, see Table 11) is considered, the ratio of benefits to costs is 2.47, meaning that Georgians received $2.47 in services for each dollar allocated to the libraries. The valuation of services plus estimated indirect and induced economic impacts for 2018 is $732,866,586 as stated in the preceding section. This yields a ratio of benefits to costs of 3.21. For every dollar of financial resources provided to public libraries in Georgia, the citizens of the state receive $3.21 in services and economic impacts.

DETERMINANTS OF LIBRARY USAGE

The array of services libraries provide to their communities has changed over the past 10 to 20 years. Libraries that once provided only books to be borrowed now offer banks of computers with information at a user's fingertips, programming for all age groups including preschool programs that prepare children for kindergarten, and meeting space for use by groups in the community. A 2015 Pew Research Center report indicated that the number of people using libraries may be waning slightly but that those who use their local libraries are valuing the service expansion and expect libraries to provide a greater variety of programs and services.[24] The analysis that follows presents models that consider two measures of library usage: the percentage of the population that are registered borrowers, and the number of library visits per borrower and per capita.

The technique used here is regression modeling. Regression is an econometric method of estimating the way one thing is affected by another. For instance, one might collect data on the height and weight of 500 students at a middle school. One would expect that as children get taller, their weight increases, all other things being equal. But, of course, all other things are never equal. Still, the regression model will tell us that for each unit of increase in height (inches), children, on average, are some amount heavier (pounds).

Suppose a researcher were to collect data on the income, age, and educational attainment of 100 randomly selected individuals. She might hypothesize that income level (the dependent variable) is affected by both educational attainment and age (the independent variables). Her hypotheses would be that income increases as educational attainment and age increase. People with more education typically earn more, and people farther along in their working life

[24] John Horrgian. 2015, September 15. "Libraries at the Crossroads: The Public Is Interested in New Services and Thinks Libraries Are Important to Communities." *Pew Research Center*. Retrieved from www.pewresearch.org/internet/2015/09/15/libraries-at-the-crossroads-methods/

probably earn more as well. Now she has two variables (education and age) that affect a third (income). Her regression model would tell her whether the variables educational attainment and age have any effect on income. The model calculates a coefficient for each independent variable, and if the effect is consistent enough across all the cases, a statistical test will indicate a level of statistical significance. The statistical test used is the Student's t. Each value of t will have an associated p value that indicates the probability of getting the result if, in fact, the relationship is not true. Social sciences researchers often consider a p-value of less than 0.05 to be an indication of statistical significance that gives confidence in the result. This means that there is less than a 5% probability of getting the result if the relationship is not true (the null hypothesis). Of course, many other things (variables) affect income, but the model can tell the researcher how much of the variation in income that education and age together explain.

Registered Borrowers

The first model created by the Institute of Government research team evaluates the determinants of the proportion of the general population that uses the library. The researchers summed the population of the counties served by each library system and calculated the percentage that are registered borrowers. This becomes the dependent variable in the model; that is, the variable that we are trying to explain. The results of this analysis are shown as Model 1 in Table 13.

The independent variables are listed in the first column of the table. These are the variables that theoretically might explain why people in the population use the library. The percentage of the population holding at least a four-year college degree is positively associated with library use. As the percentage of the population holding a degree increases, the proportion of the population that are registered borrowers increases 1.27%, other things being equal. This relationship is statistically significant at the $p<0.001$ level, meaning there is a less than a 1% chance of getting this result if the relationship were not true. The values in parentheses in Table 13 are absolute values of the t scores.

As the unemployment rate increases, the percentage of registered borrowers increases. Institute researchers investigated several economic variables, including the percentage of the population living in poverty and average household income. As in most social science regression models, these variables were collinear, meaning they each were attempting to explain the same part of the variation in the dependent variable. Each of these variables measures the relative wealth of the communities served by Georgia's libraries. While multicollinearity limits inclusion to only one of these variables, the result suggests that people in less wealthy communities are more likely to use the library's resources, other things being equal.

The third independent variable is the number of outlets each system has per 10,000 persons in the population. While the coefficient is difficult to interpret given the scale of the variable, the relationship is positive and the t-score indicates statistical significance at the $p<0.001$ level. This variable can be interpreted as a measure of convenience. The more outlets a system has relative to its population, the more convenient are the system's resources to the population served.

Expenditures per library patron are negatively associated with the percentage of the population that are registered borrowers. What this really means is that there are economies of scale that larger systems achieve with their larger populations. Higher expenditures per patron does not result in lower percentages of registered borrowers. Rather, larger numbers of registered borrowers result in lower expenditures per patron. The number of library staff and other expenses needed per 10,000 residents declines for larger populations. The next variable, patrons per library full-time equivalent staff member is positively associated with the percentage of the population using the library. While these two variables are related, their collinearity was not so high that both could not be included.

Finally, as a measure of resources, the Institute research team included the number of books per outlet. This variable is positively associated with library use but does not achieve statistical significance.

Visits Per Borrower and Per Capita

The dependent variables for Models 2 and 3 are both measures of library usage. In Model 2, the measure is visits per registered borrower. In Model 3, it is visits per capita. The variable for percentage of the population holding at least a four-year college degree is positive in both models but statistically significant only in Model 3. As already discussed, Model 1 shows that this factor is associated with higher levels of registered borrowers. Model 2 suggests only that it is not associated with more frequent use by borrowers. Model 3, however, suggests that higher levels of educational attainment are associated with higher levels of library use by the public, not just those who are registered borrowers.

Higher unemployment in a community is negatively associated with more frequent use by registered borrowers (Model 2) but positively associated with more frequent use by the general public (Model 3). This result suggests that a larger percentage of persons in communities with higher unemployment are registered borrowers and people in those communities are using the resources offered by their local library at about the same rate as persons in other communities. Although the coefficient did not reach statistical significance in Model 3, the fact that the sign of the coefficient changed from negative to positive is telling. The lack of statistical significance at the $p<0.05$ level or higher indicates that while the effect occurs in many places (the p value is

about 0.15), the effect is not consistent enough across all 63 systems to reach that level of statistical significance.

The variable for the number of outlets in each system per 10,000 residents is statistically significant in two of the three models, indicating that convenience results in both higher levels of registered borrowers (Model 1) and higher levels of use by the general public (Model 3). The lack of statistical significance in Model 2 merely indicates that registered borrowers are those individuals already likely to use the library.

Model 1 indicated that expenditures per library patron are negatively associated with the percentage of registered borrowers; the research team attributes this finding to the economies of scale that larger libraries can achieve. That is, a larger number of patrons results in lower expenditures per patron. However, Model 2 suggests that higher expenditures per patron results in increased use of the library per patron. The research team attempted to include variables for a variety of services offered by libraries, such as programming, electronic resources, and special item circulation. None of those variables shed additional light on this measure of library usage. It is likely that the quality and quantity of offerings results in more library visits per registered borrower. Neither of the final two variables — the level of staffing and the relative size of the book collection — in Models 2 and 3 were statistically significant.

Table 13. Regression Model Results

Dependent Variable:	**Model 1** Borrowers per Capita	**Model 2** Visits per Borrower	**Model 3** Visits per Capita
	Coefficient (|t|)	Coefficient (|t|)	Coefficient (|t|)
Intercept	-0.0890 * (2.4100)	3.885 * (2.06)	-0.881 * (2.04)
Percent Holding a Bachelor's Degree	1.266 *** (7.84)	4.449 (0.54)	7.645 *** (4.07)
Unemployment Rate	1.857 ** (2.93)	-14.559 (0.45)	10.795 (1.47)
Outlets per 10K Population	0.2786 *** (6.71)	0.729 (0.35)	2.972 *** (6.15)
Expenditures per Library Patron	-0.0008 * (2.5)	0.074 *** (4.54)	-0.00097 (0.26)
Patrons per Library FTE	0.0000012 * (2.14)	-0.0000467 (1.58)	0.00000152 (0.22)
Average Number of Books per Outlet	0.00000043 (1.08)	0.00000234 (0.12)	0.00000592 (1.28)

Model 1: n=63; F=56.2; probability > F=0.0000; R2=0.8575; Adj.R2=0.8422; Root MSE=0.03893
Model 2: n=63; F=5.9; probability > F=0.0001; R2=0.3855; Adj.R2=0.3196; Root MSE=1.9726
Model 3: n=63; F=27.7; probability > F=0.0000; R2=0.7480; Adj.R2=0.7210; Root MSE=0.45298
*p<0.05; **P<0.01: ***P<0.001
Source: STATA, Carl Vinson Institute of Government

CONCLUSION

Georgia's public libraries provide tremendous value in return for the investment of public dollars and private donations. For each dollar entrusted to the libraries, society receives an estimated $3.21 in goods and services plus indirect economic benefits. In addition to the traditional services of book circulation and reference assistance, today's libraries provide eBooks, electronic video, and music, plus access to vast amounts of data and information from resources around the globe. Civic clubs and organizations in many communities use library meeting space, as do student tutoring and mentoring programs.

The contingent valuation of services in this study found that the two most valuable services offered at libraries are access to electronic resources using either the library's computers or a Wi-Fi connection and materials circulation. These two services provided more than 80% of total service valuation, but other services may help attract users to the library.

This study found that communities with higher levels of education make greater use of public libraries, but also that communities with higher levels of unemployment utilize the services offered through the library system. Registered borrowers make more use of their local library as services offered increase. In regions served by more outlets, greater numbers of registered borrowers and others use the library as they find it more convenient to visit an outlet that is close to their home, work, or school.