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**Insights in the Stacks: Leveraging Data Analytics for Enhanced
Public Library Services**

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**Insights in the Stacks: Leveraging Data Analytics for Enhanced Public
Library Services**

by

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ABSTRACT

Insights in the Stacks: Leveraging Data Analytics for Enhanced Public Library Services

by

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This report aims to explore the application of data analytics in the public library sector. Through a comprehensive literature review and a targeted survey of Texas public librarians, the study seeks to evaluate the current utilization of data analytics methods, understand librarian perceptions and challenges, and identify opportunities for improving library services. Anticipated outcomes include a better understanding of how data analytics can optimize public library operations, facilitate informed decision-making processes, and the identification of necessary resources for librarians to implement data-driven strategies. By bridging the gap between data science and library science, this research endeavors to contribute valuable insights to the field, empower public libraries to maximize their impact on their communities, and adapt to the evolving needs of patrons in the digital age. Through dissemination of findings, this study also seeks to foster collaboration and knowledge-sharing among library professionals, facilitating continuous improvement and innovation in the public library sector.

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INTRODUCTION

Data analytics is an emerging field that has only risen in popularity and usage as digital technologies generate massive amounts of data across various sectors, ranging from businesses to healthcare and education. This surge in data production has prompted organizations to seek innovative ways to harness and derive meaningful insights from the vast datasets. Data analytics has emerged as a transformative tool in this endeavor and is the systematic analysis of raw data to uncover patterns, correlations, and trends. Through sophisticated algorithms and techniques, data analytics enables organizations to extract actionable insights, optimize decision-making processes, and drive strategic initiatives. Its application has revolutionized operations across various industries, enhancing efficiency and effectiveness.

In this context, public libraries find themselves at a critical juncture, poised to leverage data analytics to enhance their services and communicate value to stakeholders and the public. By adopting data analytics methods, libraries can harness the wealth of information available to them to gain deeper insights into patron needs, tailor services to community preferences, optimize resource allocation, and demonstrate the impact of their programs and initiatives. Furthermore, data analytics empowers libraries and librarians to demonstrate the impact of their programs and initiatives with empirical evidence, bolstering their credibility and relevance amidst a climate of diminishing resources.

LITERATURE REVIEW

INTRODUCTION

This literature review explores the potential of data analytics in transforming public library operations, improving service delivery, and effectively communicating value to stakeholders and the broader community. Through an examination of existing research and case studies, this review aims to shed light on the opportunities and challenges associated with implementing data analytics in the public library sector, ultimately contributing to a deeper understanding of its transformative potential.

AREAS OF APPLICATION

In today's era of data-driven decision-making, public libraries are poised to leverage data analytics to enhance and tailor their services, optimize current resources, and demonstrate their value to stakeholders. From examining trends in library card enrollment to evaluating the effectiveness of community programming, data analytics offers libraries a diverse range of applications to understand patron needs, streamline operations, and foster community engagement. This section explores the various areas in which data analytics can be applied to reshape public libraries, empowering librarians to make informed decisions, anticipate future trends, and customize services to meet the evolving needs of their communities. Through the strategic use of data, libraries can not only improve their efficiency but also strengthen their position as essential hubs for their community that enrich the lives of patrons and promote opportunities for lifelong learning.

Library Cards (Enrollment Trends, Usage, and Retainment) - Analyzing library card data provides insights into enrollment trends, patron demographics, and usage patterns.

By tracking card issuance and renewal rates, libraries can identify shifts in membership trends and tailor outreach efforts to target underserved populations. Analyzing usage data associated with library cards, such as circulation activity and database access, helps libraries understand patron behavior and preferences, enabling them to personalize services and resources. Furthermore, assessing card retainment rates allows libraries to evaluate the effectiveness of retention strategies and identify opportunities for improvement, ultimately fostering patron loyalty and engagement.

Collection Development & Management (Weeding, Space Planning, Moving Floating Collections, Predicting Trends, Assessing Digital Collections) - Collection development and management encompass a range of activities aimed at curating, organizing, and maintaining library collections. Analyzing collection data enables libraries to make informed decisions regarding weeding, space planning, and the management of floating collections. By evaluating circulation statistics, patron holds, interlibrary loan requests, and usage trends, librarians can identify materials for deselection, optimize shelf space allocation, and facilitate the movement of items within the collection. Additionally, analyzing data on borrowing patterns, circulation patterns, and digital resource usage allows libraries to predict emerging trends, anticipate patron preferences, and strategically invest in future acquisitions, ensuring that the collection remains relevant and responsive to evolving patron needs.

Reference & Information Services (User Search Behavior, Reader's Advisory, Cataloging Precision, Metadata Production) - Reference and information services play a crucial role in connecting patrons with the resources and information they need. Analyzing data related to user search behavior, query logs, readers' advisory, and

reference transactions provides insights into patron information-seeking patterns, preferences, and information literacy. By understanding how patrons navigate the library catalog and online databases, librarians can optimize search functionality, improve discoverability, and enhance user experience. Additionally, analyzing cataloging precision and metadata production data enables libraries to assess the quality and accuracy of descriptive metadata, identify areas for improvement, and streamline cataloging workflows, ultimately facilitating access to information and enhancing information retrieval efficiency.

Programming & Community Engagement (Resource Allocation, Budgeting, Diversity Audit, Assessing Value) - Programming and community engagement initiatives are instrumental in fostering connections, promoting literacy, and enriching the lives of library patrons and community members. Analyzing data on program attendance, participant demographics, and feedback surveys allows libraries to assess the effectiveness and impact of programming efforts. By tracking resource allocation, budget expenditures, and program outcomes, librarians can evaluate the return on investment, prioritize funding provisions, and demonstrate the value of programming initiatives to stakeholders. Furthermore, conducting diversity audits and analyzing patron demographic data enables libraries to assess the inclusivity and accessibility of programming offerings, identify areas for improvement, and ensure that services meet the needs of diverse communities, thereby fostering a culture of equity, diversity, inclusion, and accessibility within the library.

DATA SOURCES

Before embarking on any analysis, it's important to recognize that data serves as the cornerstone of informed decision-making and strategic planning. Data, in its myriad forms, provides the raw materials from which insights are derived, strategies are formulated, and actions are taken. In the context of public libraries, this data takes on various shapes and sizes, ranging from circulation statistics and patron demographics to program attendance and financial records. However, it's crucial to understand that not all data are created equal; distinctions exist between qualitative and quantitative data.

Qualitative data offers rich, nuanced insights into the human experience, capturing the depth and complexity of thoughts, emotions, and perceptions through narratives, observations, and interviews. Conversely, quantitative data takes a more numerical approach, focusing on measurable quantities and statistical analysis to identify patterns, trends, and relationships. While qualitative data provides depth and context, quantitative data offers precision and scalability. By recognizing the complementary nature of these two types of data, public libraries can harness their combined power to gain comprehensive insights into patron needs, preferences, and behaviors, thus informing more effective decision-making and service delivery strategies.

Circulation Statistics – Circulation statistics, encompassing data on the borrowing, holding, and return of library materials, serve as a fundamental source of insight into patron preferences and reading habits. By analyzing circulation trends, public libraries can identify popular materials, genres, and authors, enabling them to make informed decisions regarding collection development and resource allocation. Moreover, circulation statistics can highlight underutilized materials or areas with high demand, guiding librarians in optimizing the library's collection to better meet the needs of their

community. Additionally, fluctuations in circulation numbers over time can provide valuable feedback on the effectiveness of marketing initiatives, outreach programs, and changes in library policies or services.

Interlibrary Loan Services Data - Interlibrary loan (ILL) services data provides valuable insights into the demand for materials not available within the library's collection. By analyzing ILL data, libraries can identify gaps in their holdings and assess the need for expanding their collection to better serve patron interests. Understanding the types of materials requested through ILL services can inform collection development decisions, guiding acquisitions to address recurring patron requests and broaden the library's offerings. Additionally, tracking ILL requests and fulfillment metrics enables libraries to evaluate the effectiveness of their resource-sharing partnerships and consortium memberships.

Collection Data - Collection data encompasses information about the library's holdings, including materials owned, circulated, added, or withdrawn. Analyzing collection data enables libraries to assess the scope, diversity, and relevance of their collections relative to community interests and information needs. By monitoring collection usage metrics, such as circulation rates, holds, and shelf turnover, libraries can make data-driven decisions regarding collection development, deselection, and resource reallocation. Moreover, analyzing collection data in conjunction with patron demographic information can facilitate targeted acquisitions to reflect the interests and demographics of the library's user base.

Patron Data - Patron data, including demographic information, borrowing history, and usage patterns, offers rich insights into the composition and behavior of library users.

Analyzing patron data allows libraries to segment their user base according to factors such as age, gender, race, residency, native language, and library usage frequency. This segmentation enables targeted outreach efforts and personalized service delivery tailored to the diverse needs and preferences of different patron groups. Furthermore, understanding patron behavior, such as preferred formats, browsing habits, and program attendance, can inform decisions related to collection development, programming, and resource allocation. By leveraging patron data effectively, public libraries can cultivate stronger connections with their community, enhance user satisfaction, and foster greater engagement with library services and resources.

Census Data - Census data provides demographic and socioeconomic information about the communities served by public libraries. By leveraging census data, libraries can gain insights into population demographics, household characteristics, income levels, education attainment, and other relevant factors. Analyzing census data alongside patron demographics enables libraries to tailor their services and resources to meet the unique needs and interests of their community members. Moreover, census data can inform strategic planning initiatives, facility location decisions, and outreach efforts aimed at underserved populations within the library's service area.

Program Attendance – Program attendance data records the number of individuals participating in library-sponsored events, workshops, classes, and other educational or cultural programs. By tracking program attendance, libraries can evaluate the popularity and effectiveness of different programs, identify emerging trends or topics of interest, and tailor future programming to better meet community demand. Program attendance data also provides insights into patron preferences, engagement levels, and demographic

diversity, informing decisions regarding program scheduling, content development, and outreach strategies.

Door Counts - Door counts, also known as foot traffic data or facility use data, track the number of visitors entering and exiting the library premises over a specified period. This data offers valuable insights into patron engagement and library usage patterns throughout the day, week, or year. Analyzing door counts enables libraries to identify peak times of visitation, assess facility utilization rates, and optimize staffing levels and resource allocation accordingly. Additionally, door counts can inform decisions related to facility design, layout, and amenities to enhance the overall patron experience and meet evolving community needs.

Survey Data - Survey data or feedback survey data offers direct input from patrons regarding their experiences, preferences, and suggestions for improvement. Conducting surveys allows libraries to gather qualitative and quantitative feedback on various aspects of their services, resources, programs, and facilities. Analyzing survey responses can reveal patron satisfaction levels, identify areas for improvement, and uncover emerging needs or trends within the community. By soliciting feedback through surveys, public libraries demonstrate their commitment to customer service and community engagement, fostering a culture of responsiveness and continuous improvement.

Financial Data - Financial data encompasses information about the library's budget, expenditures, revenues, fundraising, and grant activities. Analyzing financial data enables libraries to assess their fiscal health, track spending patterns, and make informed decisions regarding resource allocation and financial planning. By monitoring key financial metrics, such as operating expenses, revenue sources, and cost per service,

libraries can identify opportunities for cost savings, revenue generation, and efficiency improvements. Financial data also plays a crucial role in demonstrating accountability and transparency to stakeholders, funders, and the public, showcasing the library's stewardship of financial resources and its commitment to delivering high-quality services and programs while adhering to budgetary constraints.

Other Data Sources - Public Library Data Service (PLDS) and the National Center for Education Statistics (NCES) offer valuable data resources beyond individual library systems, providing comprehensive insights into industry trends, benchmarks, and educational demographics. Managed by the American Library Association (ALA), PLDS enables libraries to access national and regional data sets, facilitating benchmarking and performance analysis to inform strategic decision-making. Meanwhile, NCES serves as a federal repository for education-related data, offering libraries insights into community demographics, academic achievement, and educational outcomes. Additionally, the Institute of Museum and Library Services (IMLS), the American Library Association (ALA), the Public Library Association (PLA), the Texas Library Association (TLA), and the Texas State Library and Archives Commission (TSLAC) serve as vital professional organizations and advocacy bodies for public libraries in Texas, offering resources, data sets, training, and support to enhance library services and promote literacy initiatives statewide. These external resources empower libraries to stay informed, advocate for their communities, and leverage data-driven strategies to better serve their patrons.

TECHNOLOGIES AND TOOLS

Now that librarians have access to a wealth of data from various sources, the next step is to harness the power of different tools and technologies to clean, consolidate, store, and analyze

this data effectively. In today's data-driven landscape, librarians are increasingly turning to a diverse array of tools and software solutions to unlock insights, identify trends, and make informed decisions that drive innovation and enhance service delivery. From data visualization platforms like Tableau to statistical analysis software such as Statistical Package for the Social Sciences (SPSS), librarians have at their disposal a toolkit of advanced analytics capabilities to transform raw data into actionable intelligence. Moreover, survey software like Microsoft Forms and Google Forms enables librarians to collect valuable feedback from patrons, while automated systems like the Automated Library Information Exchange Network (ALIEN) streamline interlibrary loan processes and resource sharing. By leveraging these tools in combination with their data expertise, librarians can unlock the full potential of their data, uncovering hidden patterns, optimizing resource allocation, and ultimately enriching the library experience for patrons and stakeholders alike.

Excel – Excel is a versatile spreadsheet software commonly used by librarians for data organization, analysis, and visualization. It offers a wide range of functions and features for data manipulation, charting, and reporting, making it a valuable tool for basic data analysis.

Statistical Package for the Social Sciences – Statistical Package for the Social Sciences (SPSS) is a statistical analysis software developed by IBM and widely used by librarians for quantitative data analysis. It offers a range of statistical techniques and tools for data manipulation, descriptive statistics, hypothesis testing, and advanced analytics.

Tableau – Tableau is a powerful data visualization tool that allows librarians to create interactive and dynamic visualizations from their library data. With Tableau, librarians can explore trends, patterns, and insights within their data through intuitive dashboards

and interactive charts. Visualization is a key step in communicating findings to stakeholders and the service community.

Survey Software – Survey software such as Microsoft Forms and Google Forms enables librarians to design and distribute surveys to collect feedback and data from patrons. These tools offer user-friendly interfaces, customizable survey templates, and robust data analysis capabilities.

Google Analytics – Google Analytics is a web analytics service that tracks and reports website traffic and user behavior. Libraries can use Google Analytics to analyze online interactions with their website, track user engagement, and measure the effectiveness of online services and resources.

Automated Library Information Exchange Network – The Automated Library Information Exchange Network (ALIEN) is a system designed to facilitate the exchange of information and resources among libraries. ALIEN enables libraries to share cataloging information, interlibrary loan requests, and other resources electronically, streamlining the process of resource sharing and improving access to materials for library patrons. This network helps libraries collaborate more efficiently, expanding access to a wider range of resources and enhancing the overall quality of library services.

SeeCollections – SeeCollections is a library collection analysis tool developed by M. Eaton in 2017 that provides insights into collection usage, circulation patterns, and item popularity. It helps libraries identify high-demand materials, assess collection diversity, and optimize collection development strategies to better meet patron needs.

Collection HQ – Collection HQ is a collection management tool designed specifically for libraries to optimize their collection development strategies. It uses data analytics to inform decisions regarding acquisitions, deselection, and inventory management, helping libraries maximize the relevance and circulation of their collections.

Bibliostat Collect and Connect – Bibliostat Collect and Connect are platforms created by Baker and Taylor for collecting and reporting library statistics. They enable libraries to submit data on various aspects of their operations, including services, staffing, and expenditures, to support national and state-level reporting requirements.

METHODOLOGIES

With access to a wealth of data and an arsenal of analytical tools at their disposal, librarians are poised to delve deeper into the realm of data-driven decision-making by employing various methodologies tailored to their unique library settings. Armed with comprehensive data sets encompassing circulation statistics, patron demographics, and program attendance, librarians can now leverage a diverse array of methodologies to extract actionable insights and inform strategic decisions. From Six Sigma for process optimization to survival analysis for studying usage patterns, librarians have a multitude of methodologies at their disposal to dissect, interpret, and derive meaning from their data. By embracing evidence-based approaches such as data-driven acquisitions and evidence-based selection planning, librarians can ensure that their collections remain relevant, responsive, and aligned with the needs and preferences of their patrons. As libraries continue to evolve in the digital age, the integration of methodologies tailored to data analysis empowers librarians to navigate complex challenges, seize opportunities, and drive innovation in service delivery and resource management.

Six Sigma – Six Sigma is a data-driven methodology aimed at improving process efficiency and quality by identifying and eliminating defects or variations. In the context of libraries, Six Sigma can be applied to streamline operations, enhance service delivery, and optimize resource utilization. By analyzing library data, such as circulation statistics, patron feedback, and workflow metrics, Six Sigma methodologies enable libraries to identify inefficiencies, root causes of problems, and opportunities for improvement. With statistical tools and techniques, librarians can implement targeted interventions and process improvements to enhance the overall effectiveness and responsiveness of library services.

Survival Analysis - Survival analysis is a statistical technique used to analyze time-to-event data, such as the duration until a specific event occurs or the lifespan of a particular entity. In libraries, survival analysis can be applied to study various phenomena, such as the lifespan of library materials, the time until patron turnover, or the duration until the occurrence of specific library events. By analyzing survival data, librarians can gain insights into usage patterns, retention rates, and factors influencing patron behavior. This information can inform collection development strategies, circulation policies, and service planning efforts, ultimately improving the library's ability to meet the needs of its patrons over time.

Data-Driven Acquisitions - Data-driven acquisitions (DDA) is a collection development strategy that utilizes usage data and analytics to inform purchasing decisions. By analyzing circulation statistics, interlibrary loan requests, and patron preferences, libraries can identify high-demand materials and automatically acquire them based on predefined criteria. DDA enables libraries to build collections that are tailored to the needs and

interests of their patrons, maximize the circulation of library materials, and optimize collection budgets.

Evidence-Based Selection Planning - Evidence-based selection planning (EBSP) involves using empirical evidence and data analysis to inform decisions regarding the acquisition and deselection of library materials. Librarians analyze circulation statistics, patron feedback, and usage trends to identify materials that are in high demand, relevant to the community, and aligned with the library's mission and goals. By basing selection decisions on evidence rather than intuition or tradition, libraries can ensure that their collections remain current, diverse, and responsive to patron needs.

Evidence-Based Stock Management - Evidence-based stock management (EBSM) involves using data analysis and performance metrics to optimize the allocation and organization of library materials within the collection. Librarians analyze circulation patterns, shelf usage, and collection turnover rates to determine optimal shelving arrangements, placement strategies, and inventory management practices. By leveraging EBSM techniques, libraries can improve the accessibility, visibility, and discoverability of library materials, enhancing the overall user experience for patrons.

Needs Assessment - Needs assessment is a systematic process of identifying and prioritizing the needs and preferences of library patrons and stakeholders. Through surveys, focus groups, and data analysis, librarians gather information about community demographics, interests, and service expectations. Needs assessment enables libraries to align their resources, programs, and services with the evolving needs of their community, ensuring that they remain relevant and responsive to changing demographics, technologies, and societal trends.

CHALLENGES AND CONSIDERATIONS

For public libraries seeking to enhance their operations, the journey towards embracing data analytics won't be without obstacles. Despite the promising prospects of utilizing data-driven insights to refine operations, guide decision-making, and showcase value to stakeholders, libraries face significant barriers in adopting data analytic methods effectively. From financial constraints and technological limitations to staffing shortages and privacy concerns, public libraries encounter various obstacles that hinder their ability to harness the full potential of data analytics. Addressing these barriers requires strategic planning, investment in training and technology, and a commitment to safeguarding patron privacy and data security. This section delves into the key challenges and barriers that could be encountered by public libraries as they strive to adopt data analytic methods.

Budget Constraints - Many public libraries operate on limited budgets, which can pose a significant challenge to adopting data analytics initiatives. Funding constraints may restrict access to necessary tools, technologies, and training needed to implement robust data analytics strategies effectively. Without adequate financial resources, libraries may struggle to invest in data analytics infrastructure, hire skilled personnel, or acquire data analysis software.

Knowledge Gaps - Some library staff may lack a comprehensive understanding of data analytics concepts and methodologies, hindering their ability to effectively leverage data for decision-making. Without proper knowledge and awareness of data analytics principles, librarians may struggle to recognize opportunities for data-driven improvements in service delivery and resource management.

Lack of Skills - Data analytics requires specialized skills in data collection, analysis, interpretation, and visualization. However, many library staff may lack the necessary technical expertise or training to perform data analysis tasks effectively. The absence of skilled data analysts within library teams can impede the adoption and implementation of data analytics initiatives.

Lack of Time - Library staff often face competing demands and time constraints, making it challenging to dedicate sufficient time and attention to data analytics projects. The time-intensive nature of data collection, analysis, and interpretation processes may deter librarians from prioritizing data analytics efforts amidst their daily responsibilities and workload.

Lack of Technology - Outdated or inadequate technology infrastructure can hinder the implementation of data analytics initiatives in public libraries. Libraries may lack access to modern data analytics tools, software applications, or hardware equipment necessary to collect, process, and analyze large volumes of data effectively. Without the appropriate technological resources, libraries may struggle to harness the full potential of their data assets.

Limited Resources - Limited human resources, staffing shortages, or organizational constraints may pose challenges to implementing data analytics projects in public libraries. Libraries may lack dedicated personnel or dedicated departments responsible for overseeing data analytics initiatives, leading to difficulties in project management, coordination, and execution.

Data Security - Data security concerns, including the protection of sensitive patron information and library data assets, can present significant barriers to adopting data analytics practices. Libraries must adhere to strict data protection regulations and privacy laws to safeguard patron confidentiality and prevent unauthorized access or data breaches. Ensuring data security compliance while leveraging data analytics tools and techniques requires careful planning, risk assessment, and implementation of robust security measures.

Patron Privacy - Public libraries have a responsibility to uphold patron privacy rights and protect the confidentiality of patron information. However, data analytics initiatives may raise concerns about the potential for privacy violations or unauthorized use of patron data. Libraries must establish clear policies and procedures for handling patron data responsibly, obtaining consent for data collection, and anonymizing or aggregating data to protect patron privacy while still deriving meaningful insights from data analytics efforts.

Copyright - Libraries must navigate copyright regulations and intellectual property rights when collecting, analyzing, and sharing data. Copyright laws may restrict the use of certain data sources or impose limitations on the sharing or dissemination of data analytics findings. Libraries must ensure compliance with copyright laws and licensing agreements while engaging in data analytics activities to avoid legal repercussions and infringement claims.

CONCLUSION

In conclusion, this literature review offers a comprehensive exploration of the potential applications of data analytics within the public library sector. Through an extensive examination

of existing research, this report has identified numerous areas where data analytics can play a pivotal role in enhancing library services, data sources that are at librarians' disposal, and methodologies that can be used to make data-driven decisions. From optimizing circulation management to refining collection development strategies and fostering community engagement, the literature highlights the transformative potential of data-driven approaches in public libraries.

Moreover, the review has underscored the challenges and impediments that public libraries face in adopting data analytics methods. Issues such as limited funding, a lack of expertise, and concerns regarding data privacy emerge as significant barriers to the widespread implementation of data analytics initiatives. However, despite these challenges, the literature also reveals a growing recognition of the importance of data analytics in informing decision-making processes and improving service delivery within the public library context.

CASE STUDY: SURVEY OF TEXAS PUBLIC LIBRARIANS

INTRODUCTION

Transitioning from the theoretical foundations laid out in the literature review, the next phase of this report involves gathering empirical data from Texas public librarians. By conducting a survey to assess their familiarity with data analytics methods, current usage of data-driven decision-making processes, and perceptions of the benefits and challenges associated with implementing data analytics initiatives in their libraries, this section of the report aims to bridge the gap between theory and practice.

The survey serves as a vital component of this report, aiming to capture firsthand insights from public library workers across Texas. It is paramount to hear directly from these professionals to gain a comprehensive understanding of the current landscape for data analytics in public libraries. By connecting directly with librarians from various geographical regions, including both rural and urban areas, this survey seeks to uncover the varied perspectives and experiences shaped by differences in funding availability and resource allocation. Understanding how opinions and challenges differ or converge between rural and urban libraries is essential for developing tailored strategies that address the unique needs of each setting.

Research Question

The following research question guides this study: to what extent are data analytics methods currently utilized in Texas public libraries, and how do these methods vary between rural and urban settings? We hypothesize that there will be significant differences in the adoption and utilization of data analytics methods between rural and urban Texas public libraries due to variations in funding availability and resource allocation. Furthermore, the survey aims to explore the perceived benefits and challenges associated with adopting data analytics methods in

Texas public libraries, anticipating differences among library professionals across the state. By amplifying the voices of public library workers statewide, this survey aims to shed light on the opportunities and obstacles surrounding data analytics adoption, ultimately informing evidence-based decision-making processes and fostering positive change in public library services across the state of Texas.

Purpose & Goal

The primary purpose of the survey is to gain comprehensive insights into the current landscape of data analytics usage within Texas public libraries. It aims to delve into various aspects, including librarians' familiarity with data analysis methods, the extent of current usage of data analytic methods, and the specific areas within library operations where these methods are applied. By probing into these dimensions, the survey seeks to illuminate the degree to which data analytics is integrated into library workflows and decision-making processes in both an urban and rural setting.

Moreover, the survey aims to unearth the benefits and challenges that librarians perceive in adopting data analytic methods within their libraries. Understanding these perspectives is crucial for identifying potential barriers to adoption and devising strategies to overcome them effectively. By capturing librarians' insights on the perceived benefits, such as improved service delivery, resource optimization, and enhanced decision-making, the survey aims to underscore the value proposition of embracing data analytics in public library settings.

The overarching goal of the survey is to gather empirical data that will inform the research objectives outlined above. By understanding the current state of data analytics adoption in Texas public libraries, the survey aims to provide actionable insights that can inform policymaking, shape professional practice, and ultimately enhance the effectiveness and impact

of public library services. Through the dissemination of findings, this study also seeks to foster collaboration and knowledge-sharing among library professionals, facilitating continuous improvement and innovation in the public library sector.

METHODOLOGY

Survey Design

The survey instrument was meticulously crafted to gather comprehensive insights into the utilization of data analytics methods within Texas public libraries. Drawing from existing literature and consultations with domain experts, the survey questions were designed to cover various dimensions of data analytics adoption, including familiarity with data analysis methods, current usage of data analytic techniques, perceived benefits and challenges, and specific areas within library operations where these methods are applied.

The survey consisted of a combination of closed-ended questions, offering respondents predefined response options, and open-ended questions, allowing for qualitative feedback and deeper insights. Closed-ended questions were structured to facilitate quantitative analysis, while open-ended questions provided respondents with the opportunity to elaborate on their experiences and perspectives, enriching the qualitative understanding of the topic.

Sample Selection

The sample of libraries for the survey was drawn from the Texas State Library and Archives Commission's (TSLAC) current library directory, compiled as of February 2024. This directory was organized into an Excel workbook featuring separate tabs for main/central libraries and branches. To ensure the inclusion of actively serving libraries with substantial community

impact, those with a service population of zero and non-accredited libraries were excluded from consideration, resulting in a refined dataset of 495 Texas public libraries.

In the sample selection process, each library was assigned a geographic label of either rural or urban based on their service population number. A designated column was created to categorize libraries as either rural or urban, employing the 2020 Census Urban Area list criteria for classification. According to this list, urban areas are defined as territories having a population of at least 5,000. Reference was made to the library's street city address rather than mailing city address for accurate classification. Drawing from data provided by the Census, a ratio of 313 rural libraries to 182 urban libraries was observed in Texas, guiding the assignment process. By adhering to these criteria and utilizing reliable data sources, a systematic and objective approach was employed to ensure accurate classification of libraries.

To facilitate a representative and balanced sample, each library was then assigned a randomized decimal number ranging from 0.0 to 1.0. Subsequently, the libraries were sorted in ascending order based on these assigned numbers. The top 50 libraries were then randomly selected for participation in the survey, ensuring that the ratio of rural to urban libraries remained consistent (32 rural libraries to 18 urban libraries).

This meticulous selection process aimed to capture a diverse representation of Texas public libraries while maintaining proportional representation across rural and urban settings, thereby enhancing the generalizability and validity of the survey findings.

Development and Distribution

The survey was developed utilizing Microsoft Forms, a versatile web-based survey platform designed for seamless creation, distribution, and data collection. Upon completion, the

survey link was distributed via email to the library director or head librarian identified in the TSLAC database. The initial cohort of 50 survey participants was allotted six weeks to complete the survey, allowing ample time for thoughtful responses. To bolster engagement and ensure comprehensive data collection, reminder emails were dispatched every two weeks until the survey's conclusion.

As the survey progressed, and to enrich the dataset further, an additional 50 participants were selected four weeks into the survey period, utilizing the same randomized sampling method outlined in the sample selection process. However, due to logistical constraints, this secondary group was afforded a two-week window to participate. This sequential approach to participant selection and engagement aimed to maximize response rates and capture a diverse range of perspectives from Texas public library professionals while efficiently managing time constraints inherent in the survey administration process.

RESULTS

Respondents

The survey had a response rate of 11% and garnered 11 responses from a diverse array of participants, with 55% representing rural libraries and 45% from urban libraries. Notably, the average service population differed significantly between rural (9,611) and urban (114,854) libraries, reflecting the varied demographics and scale of service provision across different library settings. In the population of Texas public libraries, the ratio of rural to urban libraries is 16:9, meaning for every 16 rural libraries there are 9 urban libraries. However, in the survey sample, the ratio of rural to urban libraries among respondents is 6:5. This deviation from the population ratio suggests that the survey respondent sample may be slightly skewed towards urban libraries compared to the overall distribution of public libraries in Texas. It's important to

consider this discrepancy when interpreting the survey results, as the perspectives and experiences of urban libraries may be slightly overrepresented relative to their actual proportion in the population.

Most respondents (90%) held directorial positions within their libraries, underscoring the importance of leadership buy-in and strategic decision-making in driving the adoption of data analytics initiatives.

Answer Analysis

Among respondents, 45% reported being somewhat familiar with how public library data is analyzed. Impressively, all of those who reported this level of familiarity affirmed their library's current utilization of data analytics to enhance services, reflecting a robust engagement with data-driven decision-making practices within the surveyed libraries. The minority of respondents (9%) who reported not being familiar at all with how public library data is analyzed also answered that they were unsure how the integration of data analytics into public library services could impact their library's service community.

An overwhelming majority (91%) of respondents affirmed that their libraries currently analyze data to improve services, underscoring the widespread adoption of data analytics as a strategic tool for service enhancement.

Commonly cited methods of data analysis included the examination of circulation statistics, program attendance figures, gate counts, service utilization patterns, and user demographics. These diverse analytics methods were applied across various areas of library operations, including budgeting, collection management, program planning, staffing allocation, and resource optimization.

Respondents identified a multitude of perceived benefits associated with data analytics, ranging from the provision of tailored services and programs that their specific community wants, to improved resource utilization, a clearer understanding of library performance metrics, and the ability to identify areas for improvement. Additionally, respondents highlighted the potential for data analytics to enhance fund utilization efficiency, optimize staffing levels, and adjust hours of operation to better meet patron needs.

A majority (73%) of respondents emphasized the critical importance of public libraries embracing data analytics for decision-making and service enhancement, signaling a collective recognition of the transformative potential of data-driven approaches in shaping library services for the future. No respondents answered that they thought adopting these analytics methods was unimportant.

Anticipating the integration of data analytics into public library services, 73% of respondents envisioned a positive impact on their library's service community, underscoring a prevailing optimism regarding the potential benefits of embracing data-driven methodologies. A smaller percentage of respondents (18%) were unsure of how data analytics could be integrated into their library system, highlighting the need for investing in staff education and skill training regarding data analytic methodologies.

Despite the widespread recognition of the importance of data analytics, respondents identified various barriers to its effective implementation, including time constraints, staffing limitations, budgetary constraints, and the need for enhanced staff knowledge and skills. One respondent aptly pointed out the consideration of losing the human element when it came to adopting data analytics methods, emphasizing the importance of using data to tell stories about

the impact of their library on their community and cautioning against depending too much on numbers to make decisions.

While 55% of respondents expressed the possibility of being able to repurpose their current budget for more data-driven processes, others expressed uncertainty or skepticism, reflecting the need for further exploration and dialogue regarding the allocation of resources toward data analytics initiatives. All respondents who believed their current budget could be repurposed for more data-driven processes (18%) also responded that it was extremely important for public libraries to embrace data analytics for decision-making and service enhancement.

Respondents identified a range of additional support and resources that would facilitate the effective utilization of data analytics for service improvement, including enhanced education and training for library staff, the integration of analytic tools into existing online resources, increased staffing levels, tools specifically designed to analyze library data, and additional funding support.

General Findings

In exploring the landscape of data analytics adoption among Texas public libraries, a clear distinction emerges between the perspectives and practices of rural and urban libraries. Small rural libraries, characterized by their multifaceted operational demands and limited resources, confront formidable challenges in budget allocation, resource management, and staffing. On top of these constraints, many rural librarians harbor uncertainty regarding the applicability of data analytics to their service models. However, there exists a palpable optimism among this demographic, with a shared belief in the potential of data analytics to positively impact community service delivery. While recognizing the importance of embracing data-driven

methodologies, rural respondents express a pervasive uncertainty regarding which resources and support systems are necessary to leverage data analytics effectively for service improvement.

Conversely, urban libraries present a contrasting narrative, with data analytics firmly entrenched within their operational frameworks. All urban libraries surveyed incorporate data analytics into their systems, reflecting a high degree of familiarity with its usage, with all respondents saying they are at least somewhat familiar with how it is used. Furthermore, urban respondents underscore the critical importance of embracing data analytic methods for service enhancement, with an overwhelming majority advocating for its adoption as an indispensable tool for public library decision-making. This sentiment is echoed by an emphasis on the potential positive impact of data analytics on their service community, underlining a collective commitment to leveraging data-driven insights to optimize service provision.

A noteworthy aspect shared by both rural and urban libraries is the recognition of statistics as a valuable tool for informing decision-making processes rather than dictating them. Moreover, both demographics emphasize the human element inherent in data collection, viewing it as a means to convey the impactful stories of their libraries' community contributions to stakeholders and the public. This emphasis on maintaining the human narrative amidst data-driven approaches underscores a shared commitment to preserving the intrinsic values of public library service amidst technological advancements. The consensus shared among respondents was on ensuring that potential data analytics methods are used to inform decision-making, not to make the decisions.

Overall, the juxtaposition of rural and urban perspectives illuminates nuanced dynamics in data analytics adoption within Texas public libraries. While rural libraries grapple with resource constraints and uncertainty, urban libraries demonstrate a robust embrace of data

analytics, driven by a firm conviction in its transformative potential. Despite these disparities, both demographics converge on a shared vision of leveraging data analytics as a strategic tool for enhancing public library service delivery while preserving the human-centric ethos that underpins their community engagement efforts.

CONCLUSION

The survey sheds light on the current utilization of data analytics methods in Texas public libraries, offering insights into the variations between rural and urban settings. In rural libraries, resource constraints and operational complexities contribute to the hesitation in adopting data analytics methods, with uncertainty prevailing regarding its application. Conversely, urban libraries exhibit a robust embrace of data analytics, recognizing its importance in enhancing service provision.

The direct insights from librarians underscore the significance of the findings presented in the literature review, highlighting the need for targeted support and resources to foster a culture of data-driven decision-making. By equipping libraries with the necessary tools and knowledge, stakeholders can empower their library system to leverage data analytics effectively, ultimately enhancing service delivery and community impact. Moving forward, collaborative efforts are essential to bridge the gap between data analytics potential and practical implementation, ensuring that data-driven methodologies complement the human-centric ethos that defines public library service in Texas.

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