

# Cultivating a Data Literate Workforce: Considerations for Librarians

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### Introduction

An estimated 1.7 megabytes of data are generated per second per person on earth.<sup>1</sup> Given the rapid growth of data creation, increasing automation, and expanding daily interactions with data, our collective need to become more data literate is imperative. As Sara Brown points out, “The tasks humans do often require judgment, which is improved by data literacy.”<sup>2</sup> Academic librarians have long engaged with information literacy to help students prepare for success in both personal and professional pursuits. While librarians have not always found alignment with how the term *information literacy* is understood outside our profession, data literacy presents a different opportunity. The term *data literacy* has already been widely adopted in corporate and industry workplaces, as showcased through articles in many top business news and magazine venues.

Data literacy is a rapidly evolving qualification in the workplace and, more generally, a broad organizational need. Companies have an obvious stake in fostering a data literate workforce as it creates a competitive advantage in doing business—the better a company can utilize data, the more power it can wield. Projections by Forrester Consulting, a global market research company, suggest that nearly 70 percent of the workforce would be expected to use data heavily in their work by 2025.<sup>3</sup> Decision-makers understand that data literacy skills are a requirement for their employees, with 82 percent stating that they expect basic data literacy skills from all workers in their departments.<sup>4</sup> However, Rasheed Sabar, the chief executive officer of Correlation One, notes that companies struggle to strengthen data literacy within their organizations<sup>5</sup> and that the data literacy skills gap continues to expand.<sup>6</sup> As companies increasingly adopt automation and artificial intelligence to tackle the growing volume of data, it is essential for data literacy to be demonstrated at all levels throughout the organization.<sup>7</sup>

Librarians have expressed interest in teaching data literacy but hope for partnership instead of taking on the work alone.<sup>8</sup> Interest in the development of data literacy skills is



far ranging and includes both individuals and organizations. Higher education institutions, research organizations, libraries, industries, businesses, and governments all have a stake in the development of data literacy skills in the modern workforce. Individual students, alumni, faculty, campus administrators, managers, executives, employees, and, of course, librarians are some of the roles identified with particular interest. With a broad and varied range of relevant groups and individuals, it is important to understand their respective roles, perspectives, and the value they place on data literacy as an essential workplace skill. It is also valuable to examine the interactions between the relevant groups to understand tensions that may surround the conversations on data literacy. Understanding the current state of data literacy education and workforce training can guide and inspire librarianship's response, with the aim of helping students develop needed data literacy skills for their career success.

### Data Literacy Education and Training

Since most employees deal with data in some form in their work, development of data literacy skills will require attention from academic institutions and business organizations alike. Tension surrounds, however, the question of who is responsible for providing data literacy education and training—higher education, companies, or individual employees. Some note that higher education has not been responsive in this area.<sup>9</sup> As reported in a 2021 study, higher education literature fails to address data literacy in business and workplace settings despite large-scale studies by market research firms such as Gartner and Accenture that express the strong need for these skills.<sup>10</sup> A *Harvard Business Review* article notes that the slow response by higher education forces the organizations to take the lead for employee education and training.<sup>11</sup>

When students and alumni lack needed data literacy skills, they face challenges that will affect their personal and professional lives. A 2020 report by the consulting group Accenture found that only 25 percent of employees surveyed felt fully prepared to use data effectively when entering their current role.<sup>12</sup> Additionally, the report found that 74 percent admit feeling overwhelmed or unhappy when working with data.<sup>13</sup> Employees can feel frustrated and find it challenging to manage the vast amount of data and information in their workload.<sup>14</sup> Data-rich environments may lead to data overload and technology stress, emphasizing the importance of data literacy skills development.<sup>15</sup> Feelings of being overwhelmed can lead to absences from work. The same report by Accenture found that data-induced stress led to employees missing more than five workdays per year.<sup>16</sup> Another research team who studied employee empowerment and data literacy among recent college alumni found that those who identified as data literate expressed empowerment and self-efficacy in their work life.<sup>17</sup>

For companies, increased employee satisfaction in the workplace means higher retention. As noted by Forrester, however, many companies leave the responsibility for data literacy education, training, and upskilling to employees.<sup>18</sup> More training in the data literacy skills required for the job will yield a lower turnover rate. Eighty percent of employees say that they will more likely stay at an organization if the employer provides sufficient training for the data skills needed.<sup>19</sup> Businesses have an obligation to create a pathway for more cohesive skill development. Brown says, "Companies will need to find

a path to data literacy for their workforce, which includes knowing why data literacy matters, what data literacy looks like for every employee (hint: it's not one size fits all), and how to establish a baseline of employee skills and common data language."<sup>20</sup>

The importance of data literacy extends beyond skills needed for daily work life, impacting key aspects of individuals' professional lives such as job satisfaction, salary, retention, mental well-being, and job placement. The demand for data literacy development aligns well with the core values of librarianship, which emphasize lifelong learning and the empowerment of individuals to work effectively with information and data. This agreement is recognized in the Association of College and Research Libraries (ACRL) Framework for Information Literacy for Higher Education, which sees information literacy as "extending the arc of learning throughout students' academic careers and as converging with other academic and social learning goals."<sup>21</sup> Developing data literacy skills equips employees to succeed in a job market increasingly driven by data and automation in which they need to access, understand, and leverage data.

### Data Literacy Skills Gap

In addition to the tension surrounding responsibility and roles for educating the workforce, there is also little agreement between higher education and industry on the meaning and necessary competencies of data. The research and consulting firm Gartner provides a definition which has been frequently cited, defining "data literacy as the ability to read, write and communicate data in context."<sup>22</sup> This definition is echoed in business settings including software company Qlik's explanation of such literacy as "the ability to read, work with, analyze and communicate with data."<sup>23</sup> In business conversations and literature, the term *data literacy* is often approached broadly, while the nuanced discussion of data literacy skill development is frequently overlooked in favor of a more general argument for improving business practices. Academic literature has begun to establish more competency-based examples of data literacy, approaching broad and baseline competencies as well as industry- and discipline-specific needs.

As organizations continue to grapple with the increasing volume of data, the development of new technologies, and the expanding data literacy gap, there is a need to develop strategies for improving data literacy. The data literacy gap—defined as the disparity between the perceived relevance of data and actual data literacy<sup>24</sup>—extends to nontechnical data literacy skills, which research indicates are most widely lacking.<sup>25</sup> Nontechnical skills include data-driven decision-making, understanding business data sources, communicating and presenting with data, and interpreting data.<sup>26</sup> To address this gap, academia needs to partner with industry to identify needed competencies and skills related to data literacy. Researchers argue that "all stakeholders should pay more attention to data literacy competences and integrate them into current training programs and university curriculum."<sup>27</sup> Doing so can develop a better alignment between the skills employees need and what they are taught in higher education. Josh Bersin and Marc Zao-Sanders note that organizations must invest in their employees' data literacy skills to stay competitive and improve decision-making.<sup>28</sup> As such, higher education and industry must collaborate to address the data literacy gap and equip employees with the skills needed for the data-driven future.

According to Accenture's report, only 17 percent of United States workers report having spent a significant time in their formal education learning how to use data in the workplace. This finding aligns with reports from workers in Europe and Asia, highlighting the need for more attention to data literacy education.<sup>29</sup> A 2023 systematic review highlights the lack of empirical studies in academic literature that could help improve our understanding of data literacy needs. The review emphasizes the importance of investigating the competencies required for students in different disciplines for tailoring data literacy training.<sup>30</sup> A research team lead by Marek Deja suggested that "extending data literacy and work-related empowerment research to further business areas, different market sectors, and academia has the potential to increase our awareness of the impact of datafication on employees, business, and society."<sup>31</sup>

Despite large-scale studies like those conducted by Gartner, which emphasize the importance of data literacy in the workplace, higher education literature has seldom addressed the development of data literacy skills in business settings. Researchers Bibiana Giudice da Silva Cezar and Antônio Maçada noted the lack of focus on data literacy in business and workplace settings, despite its potential impact on organizations.<sup>32</sup> Within academically focused education literature, the underrepresentation of business undergraduates in data literacy education is a notable issue.<sup>33</sup> While certain disciplines, such as accounting and construction engineering and management, have recognized the need to create specific data literacy competencies or frameworks for education,<sup>34</sup> researchers underscore the literature's lack of exploring context-specific competencies for data literacy.<sup>35</sup> Librarians, with their broad expertise across disciplines, can address the data literacy skills gap in valuable ways and bring a unique perspective to connect industry, organizations, and academia. One approach is to use our collective experience with the ACRL Framework and the creation of companion documents to contextualize literacy needs and instruction techniques. Engaging in this user-focused work is a natural extension of a librarian's information literacy instruction, particularly considering the need to establish shared vocabularies, definitions, and competencies.

#### Librarian Engagement with Data Literacy Education [A head]

Within the academic and research communities, interest in data literacy education has experienced an uptick since 2015.<sup>36</sup> Librarianship has been represented in this increase in many ways across themes of teaching data literacy, library worker skill development, and engagement with data in professional contexts. Several books focused on data literacy have been published, including *Data Literacy in Academic Libraries: Teaching Critical Thinking with Numbers* and *The Data Literacy Cookbook*.<sup>37</sup> The *Journal of Business & Finance Librarianship* published a special double volume focused on data in 2020. Also in 2020, the Federal Reserve Economic Division (FRED) sponsored a group called "Librarians Teaching with Data" to create peer-reviewed lesson plans based on the ACRL Framework to integrate data literacy into library instruction. FRED also created a digital badge librarians could earn by completing modules that help develop competencies in data literacy.<sup>38</sup> Several Institute of Museum and Library Services (IMLS) grants have focused on professional development for library workers, including "Preparing Librarians for Data Literacy Leadership," a project focused on increased data literate decision-making, and the series "Building Capacity of Academic Librarians in Understanding Quantitative Data, Data Quality Problems, and Evaluating Data Quality."<sup>39</sup>



Both grants demonstrate the varied approaches and interest in librarians' professional engagement with data literacy.

Within librarianship, business and economics librarians have expressed interest in data literacy specific to workforce skill development. In a 2020 survey conducted by librarian Charissa Jefferson, business and economics librarians expressed interest in incorporating data literacy into their instruction.<sup>40</sup> Authors Patricia Condon and Wendy Pothier suggested seven baseline data literacy competencies for business. They also sought to further establish a link between those competencies and the ACRL Framework to help solidify the values and work of librarians with the growing need for data literate employees in the business world.<sup>41</sup> This research begins to move the librarian's role in data literacy education toward skill development for workforce preparation. Librarians are not alone in asserting their value in helping teach data literacy as a workforce skill; the sentiment was also echoed in the *Fortune* magazine article "We're in a Data Literacy Crisis. Could Librarians Be the Superheroes We Need?"<sup>42</sup>

While there is ongoing debate regarding the responsibility for skill development, education, and training for data literacy in the workplace, taking meaningful action and fostering collective advocacy poses a challenge. Given the data literacy gap, the need for a data literate workforce, and the impact on our students and alumni, academic librarians have become increasingly involved in data literacy education.<sup>43</sup> Jefferson notes, however, a lack of the organizational or professional structure needed to support increased data literacy work by librarians.<sup>44</sup> We suggest a few ideas for both library organizations and librarians to consider to help the profession engage with data literacy workforce skills:

- Shared vocabulary and definitions. Librarians have used professional standards such as the ACRL Framework to anchor their professional practices in a shared language. Through professional associations and organizations, individual librarians could better align their efforts, share resources and best practices, and collectively work toward advancing data literacy skills.
- Developing competencies. Many data literacy conversations speak to broad level needs but not to specific skill or competency development. Librarians can engage in research to determine needed skills or can work with faculty colleagues to further these conversations or create course learning outcomes.
- Partnerships between higher education, professional organizations, and industry. Individual librarians often work to develop partnerships and collaborations within organizations and communities. To address the data literacy gap, however, libraries and professional library organizations could make more headway than individual librarians with regard to structure, support, and partnerships that could help sustain both success and commitment to this ongoing need.
- Taking an interdisciplinary approach. While business librarians may seem most aligned for conversations about corporate working environments, many graduates will enter workplaces with majors in fields other than business. Librarians could focus energy on helping all students develop broad nontechnical data literacy skills, since those abilities are widely lacking.
- Partnering with campus career services. Working with campus career services offices is one potential pathway to help librarians create partnership opportunities to extend data literacy conversations with both internal and external audiences.





- Connecting with alumni. Since many companies expect that employees should acquire advanced skills on their own, alumni may look to their former institutions for training opportunities. This could create an opportunity for adult learning or professional certification in partnership between corporate and academic environments, as greater collaboration is needed to understand what skills are needed and taught.

## Conclusion

Data literacy is widely recognized as an essential skill in today's workplace; however, there is a lack of consensus regarding how to address the data literacy gap in the workforce. Librarians are well equipped to lead this conversation and to provide valuable expertise and insights to improve data literacy in the workplace. These discussions should involve various relevant groups, including researchers, educators, industry leaders, employers, and employees, and should take place in both professional and academic settings. Unfortunately, these conversations often remain isolated from one another, without cohesive agreement or clear direction. Librarians can help foster relationships both within their institutions and externally and help remove the organizational silos that sometimes make it challenging for potential partners to share information. Considering the volume of data being generated, it is important for our students and alumni facing the job market to feel greater empowerment and to have necessary data literacy skills from their academic training.

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## Notes

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