IWERC

Connecting Non-Degree Digital Technology Training to Workforce Opportunity in Chicago

Report 3 of the series:

Chicago Tech Ecosystem

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External Review

To ensure that this report's contents are rigorous, accurate, and useful to educators and policymakers with varying levels of background knowledge, IWERC solicits feedback from experts. We thank Mark Harris, University of Illinois System, and Jennifer Barnett, Illinois Board of Higher Education, for their thoughtful review. We also thank each of our project participants for their insights and feedback throughout the duration of this project.

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About IWERC

The Illinois Workforce and Education Research Collaborative (IWERC) is an education research-practice partnership with the state of Illinois. IWERC works with community partners across the state to research and co-construct solutions to the most pressing issues in the cradle-to-career, education-to-workforce pipeline. IWERC's research spans four sectors: early childhood, K-12, postsecondary, and workforce. Designed to be an independent, objective source of information for the state's education and policy leaders, IWERC is housed within the College of Education at the University of Illinois Urbana-Champaign.

AI Disclosure

Microsoft Copilot Chat, Basic (University of Illinois licensed edition) was used as an assistive coding tool to match non-degree digital technology training programs with occupation codes in section 4 of this report. To complete this task, our research team developed a coding rubric based on occupation descriptions from BLS and O*NET and uploaded that rubric into Copilot. We then used Copilot to systematically assign one of 27 digital technology occupation codes (e.g. 15-1212 Information Security Analysts) to each training program, one at a time, based on program descriptions that we manually collected from each program's webpage. All coding decisions were reviewed by the research team to verify accuracy, ensure consistency across programs, and resolve any discrepancies.

IWERC

Table of Contents

Executive Summary 4
Introduction 7
Background 9
Research Questions 12
Section 1: Occupational Landscape 13
Section 2: Education Pathways 19
Section 3: Economic Mobility 36
Section 4: Training Alignment 42
Discussion and Considerations 45
Conclusion 48
References 49
Appendix A 51
Appendix B 52
Appendix C 53
Appendix D 55
Appendix E 56

Connecting Non-Degree Digital Technology Training to Workforce Opportunity in Chicago

Chicago Tech Ecosystem Series Report 3

Executive Summary

In Chicago, the digital technology economy is robust (World Business Chicago, 2025b). Both within and beyond technology sectors, employers need workers with the skills necessary to set up and manage data infrastructure, troubleshoot customer IT concerns, distill insights from large datasets, automate digital workflows, lead technical projects, protect sensitive data, and communicate information through digital interfaces. Educational credentials such as degrees, certificates, and industry certifications can signal readiness of applicants to perform in these roles. In Report 2 of our *Chicago Tech Ecosystem* series, we identified nearly 300 non-degree training programs designed to prepare learners for digital technology roles (Vaughan & Bates, 2026). Still, bachelor's degrees remain the predominant educational requirement for most digital technology occupations (Chicagoland Chamber of Commerce & HR&A Advisors, 2022).

Bachelor's degrees are also associated with higher earnings in digital technology occupations, particularly among "tech in tech" workers employed in technology roles within the technology industry (Chicagoland Chamber of Commerce & HR&A Advisors, 2022). In 2021, the median hourly wage for these workers was $54.20 in occupations where workers typically held at least a bachelor's degree, compared with $31.40 in occupations where workers typically did not. Even so, technology occupations that are more accessible to workers without four-year degrees, whether located within or outside the technology industry, still offered higher average hourly wages ($26.90) than non-technology occupations with similar educational requirements across Chicago's economy overall ($20.00 per hour) (Chicagoland Chamber of Commerce & HR&A Advisors, 2022).

There is evidence that the digital technology sector can offer meaningful employment opportunities across education levels. What remains less clear is which digital technology occupations provide realistic entry points through non-degree training in Chicago and how well the availability of non-degree training programs aligns with regional labor market demand. This report, the third and final installment in the *Chicago Tech Ecosystem Series*, explores these questions.

Report 1 mapped the organizations that comprise Chicago's digital technology training and workforce development ecosystem. Report 2 examined the characteristics of available non-degree digital technology training programs. Building on those findings, this report assesses whether the distribution of training programs aligns with labor market opportunities by identifying occupations that offer the strongest combination of demand, wage potential, and accessibility without a four-year degree.

The key takeaways for this report are as follows:

1. **Occupational pathways into digital tech roles for workers without a bachelor's degree can be broken into three tiers.**[1] Tier 1 is the most accessible from an educational entry point perspective. Between 42% and 50% of employees in these jobs possess an associate's degree or less,[2] and all of these roles (n = 4) are in Cloud & IT Infrastructure. In Tier 2 roles (n = 7), roughly 25%-30% of workers possess an associate's degree or less. These occupations span the fields of Software Development; Cloud & IT Infrastructure; Cybersecurity; User Interface & User Experience Design; and Technical Leadership & Project Management. Tier 3 occupations are least likely to employ workers without at least a bachelor's degree. Between 13% and 22% of workers in these roles possess an associate's degree or less. Tier 3 roles (n = 5) represent Cloud & IT Infrastructure; Emerging & Integrated Technologies; Software Development; and Data Science & AI.
2. **There are more individuals with some college, no degree than with associate's degrees working in digital technology occupations, but bachelor's degrees still represent the hard line of demarcation between degree and non-degree holders.** In our analysis of current workers' educational attainment across digital technology occupations, there is only one occupation for which the share of employees with an associate's degree is higher than the share of employees with some college, no degree (Computer Hardware Engineers). Across all digital technology occupations, the average percentage of workers with some college, no degree is 14% as compared to an average of 9% for associate degree holders. In contrast, the average percentage of workers with bachelor's degrees is 46%.

[1] We grouped occupations into three tiers based on observed breaks in the distribution of the share of workers without a bachelor's degree. While the separation between the lower and middle tiers was modest in absolute percentage points, the tiers reflect meaningful differences in the prevalence of non-degree workers within an occupation and, by extension, the apparent accessibility of the occupation through non-degree pathways.

[2] Including Less than a high school diploma; High school diploma or equivalent; and Some college, no degree.

3. **Digital Tech job growth is slow and concentrated in occupations that are less accessible to workers without bachelor's degrees.** Despite a net gain of 1,600 jobs overall (1.1% growth), half of the region's digital tech occupations are projected to experience declines in number of jobs in the next 10 years. All Tier 1 occupations— which have the highest concentrations of workers without bachelor's degrees—are projected to decline, reducing their share of jobs from 27% to 24%. Conversely, Tier 3 occupations are generally expected to grow, ultimately accounting for 55% of all digital tech jobs in the region by 2035. Notably, our present analysis does not account for predicted AI disruption.
4. **Seven digital technology roles are high-opportunity occupations that offer viable pathways into relatively high-wage employment for job seekers with less than a bachelor's degree in Chicago, but non-degree training program offerings are not entirely well-aligned to these positions.** Current median wages in Chicago for these roles range from $87,000 - $174,000 annually, well above the Chicago median annual wage of $73,380.[3] **Information Security Analysts** are well represented in non-degree training program offerings, accounting for 45 programs (16% of the sample). **Network and Computer Systems Administrator** roles are associated with 33 programs (11%). **Computer Network Architects** (3%), **Software Quality Assurance Analysts and Testers** (2%), and **Web and Digital Interface Designers** (2%), account for far fewer programs with eight, five, and five programs each, respectively. There is just one program that prepares learners for the **Computer and Information Systems Manager** role. We did not identify any programs that directly correspond with the role of **Computer Systems Analyst**. Interestingly, 33 programs (11%) prepare learners for Software Developer roles, despite these occupations having relatively low representation of workers without bachelor's degrees.

[3] Source: Occupational Employment and Wage Statistics (OEWS) Query System, https://data.bls.gov/oes/#/area

Connecting Non-Degree Digital Technology Training to Workforce Opportunity in Chicago

Chicago Tech Ecosystem Series Report 3

Introduction

Chicago has a large and growing digital technology economy. Presently, the digital technology sector accounts for roughly 28% of all active companies head-quartered in Chicago.[4] In 2025, Chicago's digital technology economy yielded $42 billion in output (9th in the nation), employed 103,331[5] workers, and comprised 7,850 businesses (up 84% from 2024) (World Business Chicago, 2025b, p. 1). Beyond technology companies themselves, workers with digital technology skills are employed across industries throughout the regional economy, creating continued demand for technical talent.

Chicago has built a substantial pipeline for developing this talent. In 2024, higher education institutions in Chicagoland reported over 11,000 program completions in computer and information sciences, up 100% from 2020, and another roughly 5,500 in engineering and engineering technologies (World Business Chicago, 2025b, p. 1). Options for training outside of formal degree pathways exist as well. In Report 2 of the *Chicago Tech Ecosystem Series*, we identified 290 non-degree digital technology programs offered by 44 providers, including colleges, universities, and independent training providers throughout the Chicago region (Vaughan & Bates, 2026).

Nonetheless, Chicago's non-degree digital tech training landscape operates within a labor market where a bachelor's degree remains the predominant educational requirement. In 2021, 65% of jobs in Chicago's technology ecosystem were in occupations where workers' average educational attainment was a bachelor's degree or higher, compared with 34% of jobs across the city's economy (Chicagoland Chamber of

[4] Based on our original analysis of business data, housed on the online platform Crunchbase. Searches were conducted in March 2026 and limited to active companies with headquarters in Chicago. An initial data pull indicated that nearly 38% (n =10,534 out of 27,863) of active companies headquartered in Chicago operate as part of the broader technology industry landscape. When further filtering by selected industries aligned with our project framing, *7,816 digital technology* companies emerged. See Appendix for list of filters. Crunchbase is a platform for startups and investors to research and track companies. It contains information on company funding, employees, and partnerships. For more information see: https://support.crunchbase.com/hc/en-us/articles/360009616013-Where-does-Crunchbase-get-their-data .

[5] This number reflects workers employed only within nine digital technology sub-industries and does not account for technology employees working in other sectors. See "Digital Tech Industry Profile" at https://worldbusinesschicago.com/the-research-center/.

Commerce & HR&A Advisors, 2022, p. 20). The same analysis found that workers in five of Chicago's ten largest technology ecosystem occupations had an average educational attainment below a bachelor's degree. However, this list included non-tech roles within technology industries, such as customer service and sales representatives, in addition to technical roles such as computer systems analysts, computer user support specialists, and computer network support specialists (p. 22). The median wage for jobs within Chicago's technology ecosystem is also higher than the median across the city's economy, and highest of all for technology roles in the technology industry with average educational attainment at or above the bachelor's degree level.[6] Technology occupations with average educational attainment below a bachelor's degree also pay more than jobs at the same education level across Chicago's economy, on average.[7]

All told, there is hope that the digital technology sector can offer meaningful opportunities for employment at different education levels, but it remains unclear which digital technology occupations provide realistic entry points through non-degree training. This raises a practical question, then, about what Chicago's non-degree training programs can lead to for learners. Some programs may prepare learners for occupations with many openings and strong wages. Others may be connected to smaller parts of the labor market or to jobs where employers continue to favor applicants with bachelor's degrees. For an adult deciding whether to invest several months and potentially thousands of dollars in training, these differences matter. Thus, understanding viable pathways into digital technology roles vis-à-vis non-degree training requires looking more closely at regional demand, wages, and the preparation associated with individual occupations.

[6] Among jobs with average educational attainment at or above a bachelor's degree, the median hourly wage was $54.20 for tech occupations in tech industries, $50.10 for tech occupations in non-tech industries, and $46.30 for non-tech occupations in tech industries. The median was $50.30 across the technology ecosystem and $44.70 across Chicago's overall economy (Chicagoland Chamber of Commerce & HR&A Advisors, 2022, p. 21).

[7] Among jobs with average educational attainment below a bachelor's degree, the median hourly wage was $31.40 for tech occupations in tech industries, $29.50 for tech occupations in non-tech industries, and $22.40 for non-tech occupations in tech industries. The median was $26.90 across the technology ecosystem and $20.00 across Chicago's overall economy (Chicagoland Chamber of Commerce & HR&A Advisors, 2022, p. 21).

Background

Defining Digital Technology Industries and Occupations

Digital technology can refer to both an industry and a type of work, but the two are not interchangeable. Industries are classified according to the primary activities of businesses and other employers, while occupations are classified according to the work employees perform. A software developer working for a bank, for example, holds a digital technology occupation within a non-technology industry. A sales representative working for a software company is employed within the digital technology industry but does not hold a digital technology occupation. This distinction is important because demand for digital technology workers extends across many parts of the economy (Chicagoland Chamber of Commerce & HR&A Advisors, 2022).

Industries

The North American Industry Classification System (NAICS) groups businesses according to their primary economic activity. It does not identify a single official "digital technology" sector (U.S. Census Bureau, 2022). Instead, researchers and economic development organizations construct definitions by selecting the NAICS industries most relevant to the work being studied. World Business Chicago (2025a) includes *Software Publishing*; *Data Processing and Hosting*; *Custom Computer Programming*; *Computer Systems Design*; *Computer Facilities Management*; *Other Computer-related Services*; *Web Search Portals*, *Media Streaming*, and *Research and Development* in their analysis of the digital technology sector. In 2025, the *Custom Computer Programming* and *Computer Systems Design* industries employed the most digital technology workers in Chicago, at 29,567 and 26,734 workers, respectively (World Business Chicago, 2025b). Across Chicago's economy, however, employers in finance, healthcare, logistics, manufacturing, and other industries also rely on workers who can develop software, analyze data, manage digital infrastructure, and protect information systems (World Business Chicago, 2025a). Thus, the need for digital technology workers extends beyond the technology industry, broadening the scope of demand.

Occupations

Occupational definitions approach digital technology from the work being performed rather than the employer's industry. The U.S. Bureau of Labor Statistics (BLS) describes computer and information technology occupations as those involved in creating or supporting computer applications, systems, and networks. These occupations include software developers; computer systems analysts; information security analysts; database administrators; database architects; computer support specialists; network administrators; web developers, and related roles (U.S. Bureau of Labor Statistics, 2026). Other frameworks use a somewhat broader definition. Advance CTE treats Digital Technology as a cross-cutting career cluster organized around the development and use of digital systems, including artificial intelligence, data analytics, cybersecurity, software, network systems, IT support, web and cloud technologies, and unmanned vehicles (Advance CTE, 2024, pp. 2, 5). Jobs for the Future (JFF, 2026) similarly defines technology jobs as "roles in which people who have IT expertise provide services to individuals and organizations to help them build, maintain, or upgrade computer systems, networks, or software, with an emphasis on cloud computing, big data, and cybersecurity" (para. 8).

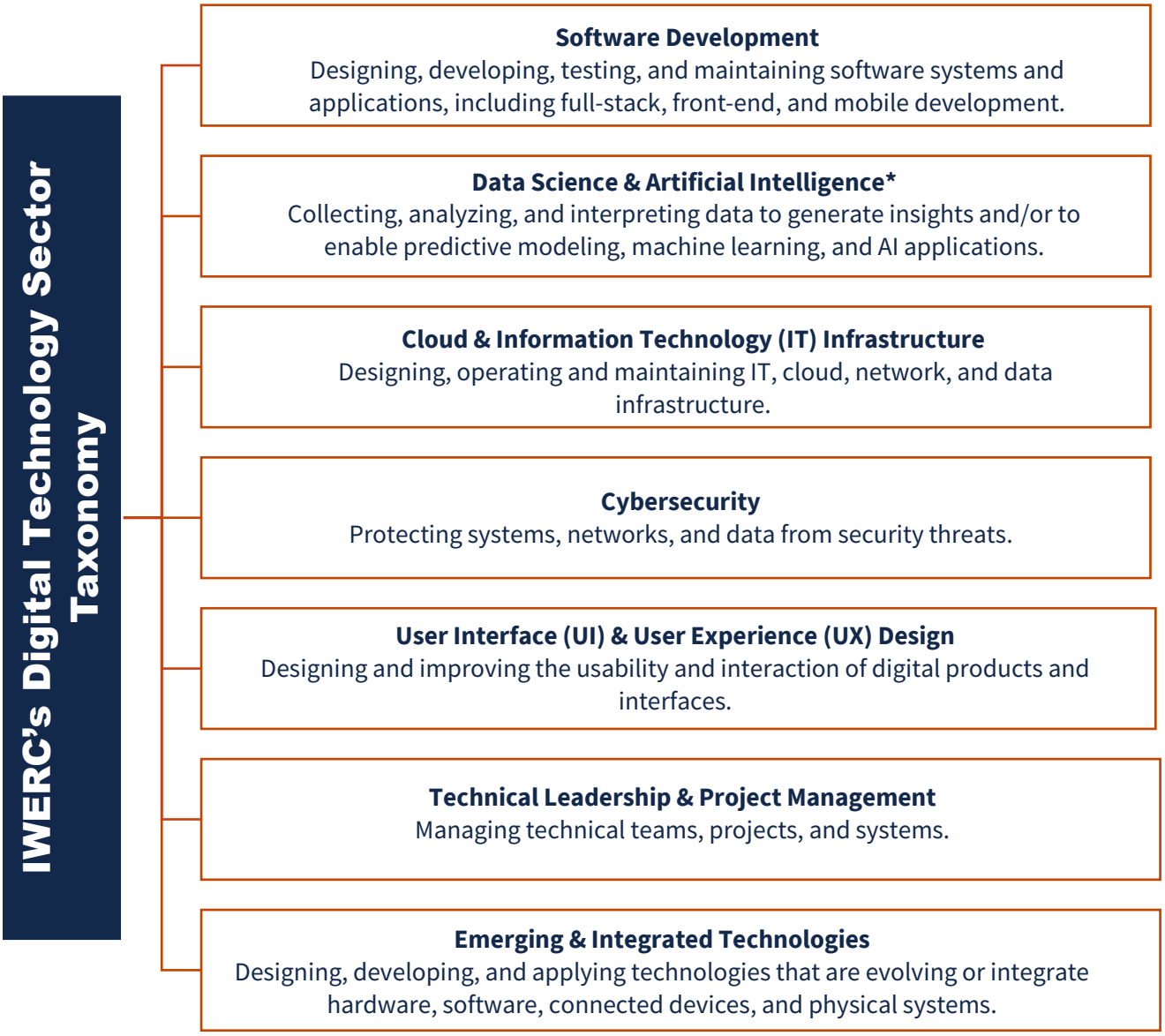
Defining Digital Technology Jobs

Drawing on these definitions, this study treats digital technology occupations as roles centered on developing, operating, supporting, securing, or managing digital systems and technology, regardless of industry. The occupations are organized across seven domains: *Software Development*; *Data Science and AI*; *Cloud and IT Infrastructure*; *Cybersecurity*; *UI/UX and Interface Design*; *Technical Leadership and Project Management*; and *Emerging and Integrated Technologies* (Figure 1).

Digital Technology Jobs

Occupations focused on developing, operating, supporting, securing, or managing digital systems and technology, organized across the domains of: Software Development; Data Science and AI; Cloud and IT Infrastructure; Cybersecurity; UI/UX and Interface Design; Technical Leadership and Project Management; and Emerging and Integrated Technologies, regardless of industry.

Figure 1. IWERC's Digital Technology Sector Taxonomy.



Note: *Artificial intelligence may also be incorporated into programs classified in other sectors. Programs are classified here when data science, machine learning, or AI is their primary focus.

Research Questions

The central question guiding this report is: **What role do non-degree training programs play in preparing jobseekers for employment in Chicago's digital technology economy?**

To address this question, we examine the following:

1. **Occupational landscape**. Which occupations comprise the digital technology workforce and how are they distributed across each digital technology domain?
2. **Education pathways**. What kinds of education, training, and preparation requirements are associated with each occupation? What do these requirements reveal about opportunities for jobseekers without a four-year degree in Chicago?
3. **Economic mobility**. Which digital technology occupations show the strongest current and projected demand in the Chicago region? Which occupations can be considered high-opportunity occupations, based on their combination of demand, wage potential, and accessibility through non-degree pathways?
4. **Training alignment**. For which occupations do non-degree digital technology training programs in Chicago prepare jobseekers? To what extent does the distribution of non-degree digital tech training programs align with high-opportunity occupations?

Section 1: Occupational Landscape

RQ1. Which occupations comprise the digital technology workforce and how are they distributed across each digital technology domain?

To create a baseline dataset of digital technology occupations, we cross-referenced occupation descriptions from the BLS 2018 Standard Occupational Classification (SOC) System (U.S. Bureau of Labor Statistics, 2018) and U.S. Department of Labor's O*NET-SOC 2019 Taxonomy (National Center for O*NET Development, 2026b)[8] against IWERC's Digital Technology Sector Taxonomy (Figure 1), looking for roles in which technical knowledge and skills related to digital competencies are central to the nature of the work.

Because our digital sector taxonomy encompasses Software Development; Data Science & Artificial Intelligence; Cloud & Information Technology (IT) Infrastructure; Cybersecurity; User Interface (UI) and User Experience (UX) Design; Technical Leadership & Project Management; and Emerging & Integrated Technologies, we paid special attention to *Management*; *Computer and Mathematical*; *Architecture & Engineering*; *Life, Physical, and Social Science*; *Arts, Design, Entertainment, Sports, and Media*; and *Office and Administrative Support* occupation groups. Through this process, **we identified 27 occupations across three major group codes**: *15-0000 Computer and Mathematical Occupations* (n = 24), *17-0000 Architecture and Engineering Occupations* (n = 2), and *11-0000 Management Occupations* (n = 1).[9] Table 1 includes a list of these occupations and their summary descriptions according to O*NET OnLine.

[8] The 2019 Department of Labor O*NET taxonomy is based on the 2018 BLS SOC system but includes more granular occupational categories. Thus, codes ending in .01, .02, or another extension beyond .00 are 2019 O*NET codes, and the others are 2018 BLS SOC codes. For more, see https://www.onetcenter.org/taxonomy.html.

[9] We vetted this list with participants of our project webinars and in-person convenings. For a detailed description of our overall project design, see Report 1 of the *Chicago Tech Ecosystem Series*.

Table 1. List of digital technology occupations.

Code	Occupation	Description[10]
11-3021.00	**Computer & Information Systems Managers**	Plan, direct, or coordinate activities in such fields as electronic data processing, information systems, systems analysis, and computer programming.
15-1211.00	**Computer Systems Analysts**	Analyze science, engineering, business, and other data processing problems to develop and implement solutions to complex applications problems, system administration issues, or network concerns.
15-1212.00	**Information Security Analysts**	Plan, implement, upgrade, or monitor security measures for the protection of computer networks and information. Assess system vulnerabilities for security risks and propose and implement risk mitigation strategies.
15-1231.00	**Computer Network Support Specialists**	Analyze, test, troubleshoot, and evaluate existing network systems, such as local area networks (LAN), wide area networks (WAN), cloud networks, servers, and other data communications networks. Perform network maintenance to ensure networks operate correctly with minimal interruption.
15-1232.00	**Computer User Support Specialists**	Provide technical assistance to computer users. Answer questions or resolve computer problems for clients in person, via telephone, or electronically. May provide assistance concerning the use of computer hardware and software, including printing, installation, word processing, electronic mail, and operating systems.
15-1241.00	**Computer Network Architects**	Design and implement computer and information networks, such as local area networks (LAN), wide area networks (WAN), intranets, extranets, and other data communications networks. Perform network modeling, analysis, and planning, including analysis of capacity needs for network infrastructures.
15-1242.00	**Database Administrators**	Administer, test, and implement computer databases, applying knowledge of database management systems. Coordinate changes to computer databases. Identify, investigate, and resolve database performance issues, database capacity, and database scalability. May plan, coordinate, and implement security measures to safeguard computer databases.
15-1243.00	**Database Architects**	Design strategies for enterprise databases, data warehouse systems, and multidimensional networks. Set standards for database operations, programming, query processes, and security. Model, design, and construct large relational databases or data warehouses.
15-1243.01	**Data Warehousing Specialists**	Design, model, or implement corporate data warehousing activities. Program and configure warehouses of database information and provide support to warehouse users.

[10] Descriptions are abbreviated. See associated occupation link for more.

15-1244.00	**Network & Computer Systems Administrators**	Install, configure, and maintain an organization's local area network (LAN), wide area network (WAN), data communications network, operating systems, and physical and virtual servers. Perform system monitoring and verify the integrity and availability of hardware, network, and server resources and systems. Review system and application logs and verify completion of scheduled jobs, including system backups.
15-1251.00	**Computer Programmers**	Create, modify, and test the code and scripts that allow computer applications to run. Work from specifications drawn up by software and web developers or other individuals. May develop and write computer programs to store, locate, and retrieve specific documents, data, and information.
15-1252.00	**Software Developers**	Research, design, and develop computer and network software or specialized utility programs. Analyze user needs and develop software solutions, applying principles and techniques of computer science, engineering, and mathematical analysis.
15-1253.00	**Software Quality Assurance Analysts & Testers**	Develop and execute software tests to identify software problems and their causes. Test system modifications to prepare for implementation. Document software and application defects using a bug tracking system and report defects to software or web developers. Create and maintain databases of known defects.
15-1254.00	**Web Developers**	Develop and implement websites, web applications, application databases, and interactive web interfaces. Evaluate code to ensure that it is properly structured, meets industry standards, and is compatible with browsers and devices.
15-1255.00	**Web & Digital Interface Designers**	Design digital user interfaces or websites. Develop and test layouts, interfaces, functionality, and navigation menus to ensure compatibility and usability across browsers or devices. May use web framework applications as well as client-side code and processes.
15-1255.01	**Video Game Designers**	Design core features of video games. Specify innovative game and role-play mechanics, story lines, and character biographies. Create and maintain design documentation. Guide and collaborate with production staff to produce games as designed.
15-1299.01	**Web Administrators**	Manage web environment design, deployment, development and maintenance activities. Perform testing and quality assurance of web sites and web applications.
15-1299.04	**Penetration Testers**	Evaluate network system security by conducting simulated internal and external cyberattacks using adversary tools and techniques. Attempt to breach and exploit critical systems and gain access to sensitive information to assess system security.
15-1299.05	**Information Security Engineers**	Develop and oversee the implementation of information security procedures and policies. Build, maintain and upgrade security technology, such as firewalls, for the safe use of computer networks and the transmission and retrieval of information. Design and

		implement appropriate security controls to identify vulnerabilities and protect digital files and electronic infrastructures.
15-1299.06	**Digital Forensics Analysts**	Conduct investigations on computer-based crimes establishing documentary or physical evidence, such as digital media and logs associated with cyber intrusion incidents. Analyze digital evidence and investigate computer security incidents to derive information in support of system and network vulnerability mitigation. Preserve and present computer-related evidence in support of criminal, fraud, counterintelligence, or law enforcement investigations.
15-1299.07	**Blockchain Engineers**	Maintain and support distributed and decentralized blockchain-based networks or block-chain applications such as cryptocurrency exchange, payment processing, document sharing, and digital voting. Design and deploy secure block-chain design patterns and solutions over geographically distributed networks using advanced technologies. May assist with infrastructure setup and testing for application transparency and security.
15-1299.08	**Computer Systems Engineers/Architects**	Design and develop solutions to complex applications problems, system administration issues, or network concerns. Perform systems management and integration functions.
15-1299.09	**Information Technology Project Managers**	Plan, initiate, and manage information technology (IT) projects. Lead and guide the work of technical staff. Serve as liaison between business and technical aspects of projects. Plan project stages and assess business implications for each stage. Monitor progress to assure deadlines, standards, and cost targets are met.
15-2051.00	**Data Scientists**	Develop and implement a set of techniques or analytics applications to transform raw data into meaningful information using data-oriented programming languages and visualization software. Apply data mining, data modeling, natural language processing, and machine learning to extract and analyze information from large structured and unstructured datasets.
15-2051.01	**Business Intelligence Analysts**	Produce financial and market intelligence by querying data repositories and generating periodic reports. Devise methods for identifying data patterns and trends in available information sources.
17-2061.00	**Computer Hardware Engineers**	Research, design, develop, or test computer or computer-related equipment for commercial, industrial, military, or scientific use. May supervise the manufacturing and installation of computer or computer-related equipment and components.
17-3024.01	**Robotics Technicians**	Build, install, test, or maintain robotic equipment or related automated production systems.

We did not include roles such as computer and information research scientists, audio and video technicians, statisticians, graphic designers, sales representatives, search marketing strategists, and health informatics specialists, despite potential overlap in their day-to-day functions. Keeping a narrower focus on computer technology-based roles allowed us to more accurately analyze how available digital technology training pathways align with the occupations they are intended to prepare participants for in Chicago, especially within the non-degree education sector.

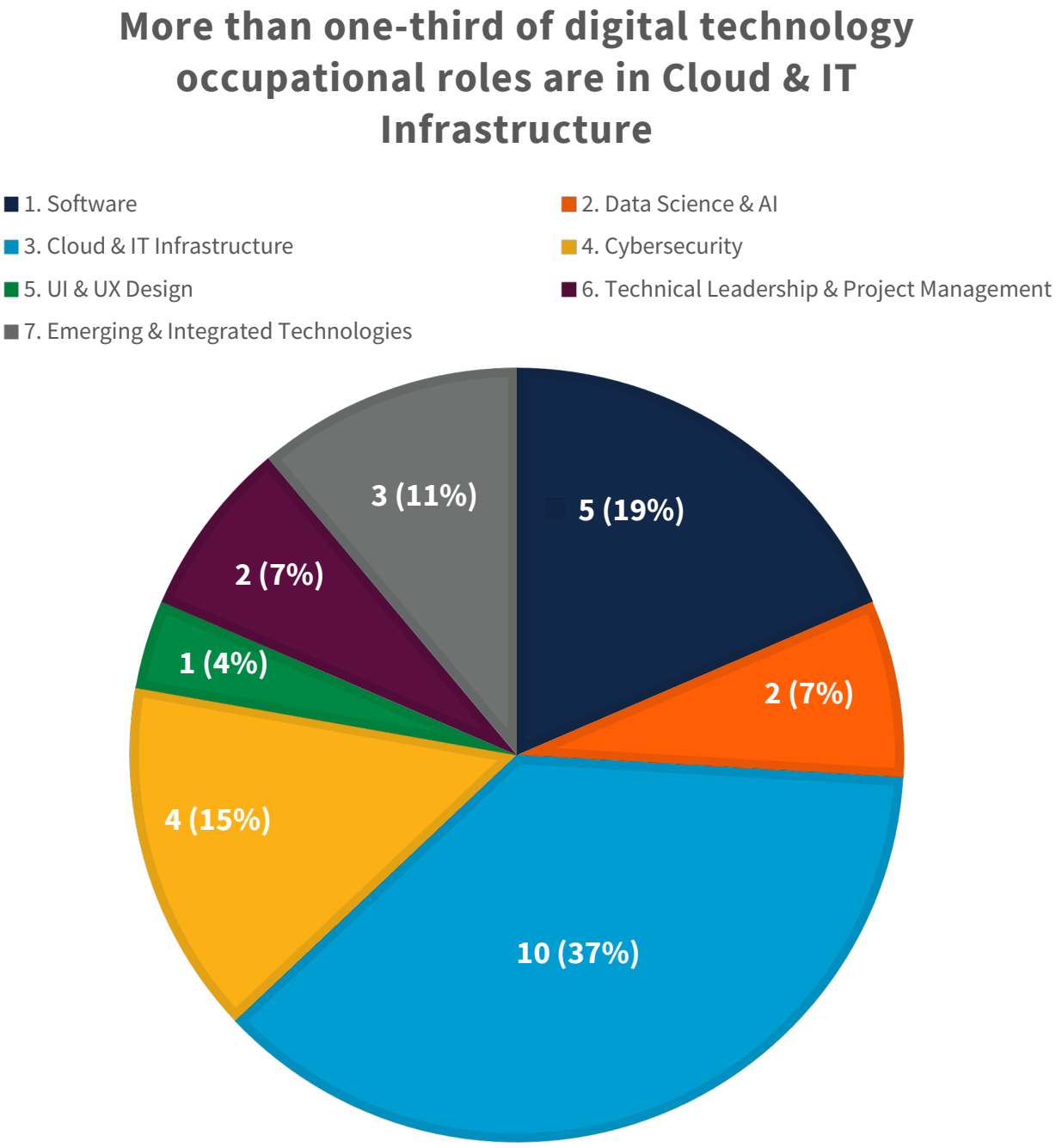
Once our list of occupations was complete, we mapped each occupation into one of our seven digital tech sector domains based on the primary functions of that role and sample job titles reported by O*NET Online. For example, Information Security Analysts (15-1212.00) "plan, implement, upgrade, or monitor security measures for the protection of computer networks and information" (National Center for O*NET Development, 2026b). These functions align with the domain of Cybersecurity which focuses on protecting systems, networks, and data from security threats (Figure 1).[11]

Distribution across Domains

Of the 27 BLS and O*NET digital technology occupations identified above, n = 10 (37%) fall within Cloud & IT Infrastructure, making it the largest domain. Software Development is next with n = 5 occupations (19%). Cybersecurity includes n = 4 (15%), followed by Emerging & Integrated Technologies with n = 3 (11%). Data Science & AI and Technical Leadership & Project Management each include two occupations (7%), and UI & UX Design includes one (4%). See Appendix B for the list of occupations organized by domain. See Figure 2 below.

[11] For a detailed description of how we constructed our digital technology taxonomy, see Report 1 of our Chicago Tech Ecosystem Series.

Figure 2. Number of occupational roles in each digital technology domain.



Note: Pie slices represent the distribution of the number of BLS and O*NET occupational roles found within each domain of the digital technology sector, followed by the percentage of roles out of N = 27. The distribution of occupational roles does not equate to the distribution of number of workers within each role or domain.

Section 2: Education Pathways

RQ2. What kinds of education, training, and preparation requirements are associated with each occupation?

Job readiness can be thought of in terms of typical educational and related experience requirements and typical educational attainment (U.S. Bureau of Labor Statistics, n.d.).

The U.S. Department of Labor (O*NET) and Bureau of Labor Statistics (BLS) provide ways of categorizing educational and training requirements. O*NET Job Zones, for instance, describe roles based on "how much education people need to do the work, how much related experience people need to do the work, and how much on-the-job training people need to do the work" (National Center for O*NET Development, n.d., para 1). Job Zones are given a number 1-5 based on progressively more education and/or training required for the role.

O*NET Job Zones

- **Job Zone 1-2: Very Little to Some Preparation Needed.** Usually requires a high school diploma or GED, though some occupations may not. Previous experience and/or on-the-job training ranges from none to one year. *Examples: Dishwasher, Parking Attendant, Cashier*
- **Job Zone 3: Medium Preparation Needed.** Typically requires training in vocational schools, related on-the-job experience, or an associate's degree. A recognized apprenticeship program may be associated with these occupations. *Examples: Barbers, Paramedics, Tax Preparers*
- **Job Zone 4: Considerable Preparation Needed.** Typically require a four-year bachelor's degree. Employees in these occupations usually need several years of work-related experience, and on-the-job, and/or vocational training. *Examples: Sales Managers, Agricultural Engineers, Chemists*
- **Job Zone 5: Extensive Preparation Needed**. Usually requires graduate school (Ph.D., M.D., J.D.). Many jobs require more than five years of experience. Employees may need some on-the-job training, but most of these occupations assume that the person will already have the required skills and knowledge. *Examples: Cardiologists, Survey Researchers, Urban and Regional Planners*

Source: https://www.onetonline.org/help/online/zones

BLS provides data on typical education and experience needed to enter an occupation including:

Typical Education Needed for Entry

- No formal educational credential
- Less than a high school diploma
- High school diploma or equivalent
- Some college, no degree
- Associate's degree
- Bachelor's degree
- Master's degree
- Doctoral or professional degree

and

Work Experience in a Related Occupation

- None
- Less than 5 years
- 5 years or more

in addition to the actual educational attainment of workers aged 25 and over (percent of people in each role who currently possess the specified credential) nationally (U.S. Bureau of Labor Statistics, 2025a). Although BLS reportedly collects data related to non-degree postsecondary awards such as certificates, professional certifications are not included (U.S. Bureau of Labor Statistics, n.d.). We did not find any BLS postsecondary nondegree award data associated with our occupational analysis. Non-degree credentials are not captured in the some college, no degree category.

In the section that follows, we examine the *preparation requirements* and *educational attainment* of current workers employed in the 27 occupations identified in Section 1 across our seven digital sector domains. For each domain, a table highlights each related occupation and its associated Job Zone (National Center for O*NET Development, n.d.), Typical Entry Level Education (U. S. Bureau of Labor Statistics, 2025b), and Work Experience in Related Occupation (U. S. Bureau of Labor Statistics, 2025b). The figure that follows in each domain shows the distribution of educational levels held by current employees aged 25 and older in each occupation nationally, as data availability allows (U.S. Bureau of Labor Statistics, 2025a). Eleven O*NET 2019 occupations are not included in these BLS tables and are therefore labeled N/A for typical entry-level education, job-related training, and national educational attainment. A complete table of workers' educational attainment by BLS occupation is provided in Appendix C.

1. Software Development

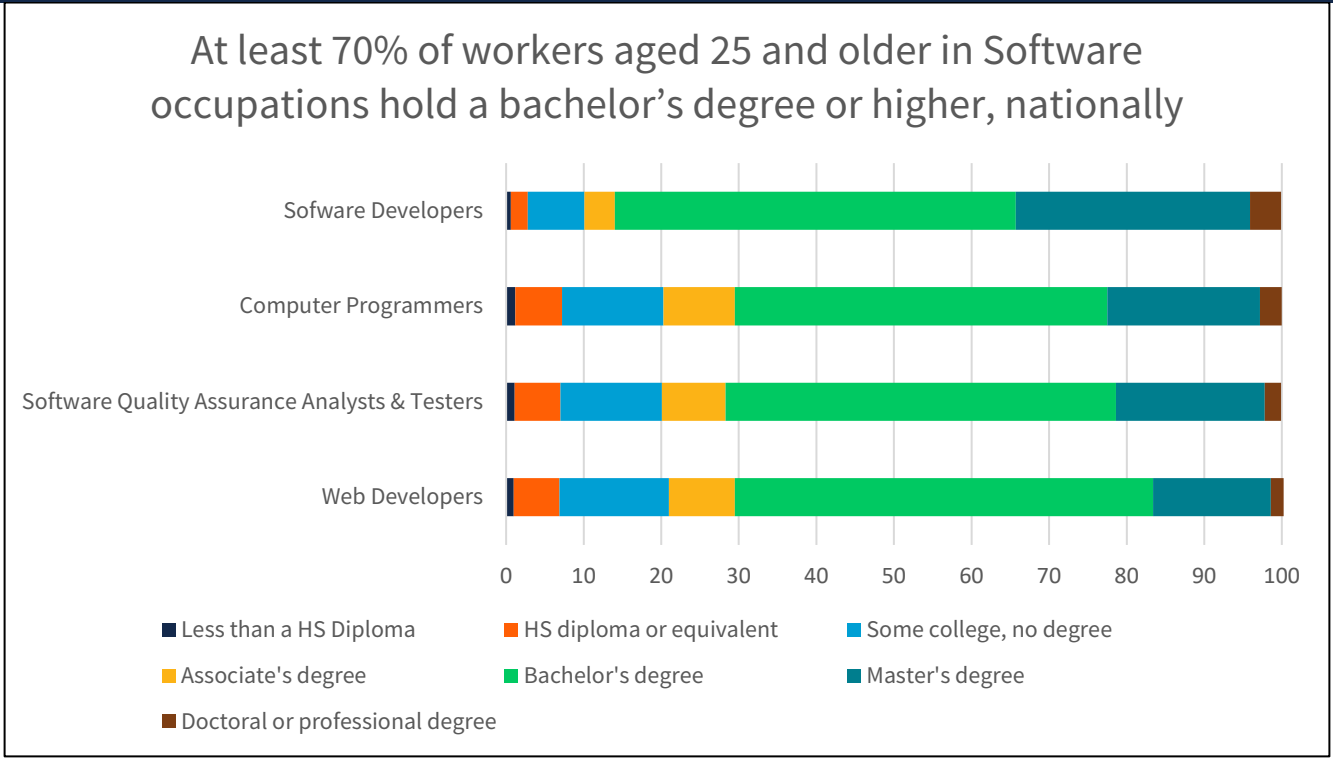
Software Development includes occupations focused on creating, testing, and maintaining software, websites, and other digital applications. O*NET classifies four of the five occupations listed within this domain as requiring considerable preparation, which typically includes a bachelor's degree (Table 2). Web Developers is the exception, falling within Job Zone 3, which typically requires vocational training, related work experience, or on-the-job training. Nevertheless, a bachelor's degree is the typical entry-level education for all four software occupations included in the BLS data.

Table 2. Software Development occupations and required preparation.

Code	Occupation	O*NET Job Zone	Typical Entry Level Education	Related Experience
15-1252.00	**Software Developers**	Zone 4: Considerable Prep Needed	Bachelor's Degree	None
15-1251.00	**Computer Programmers**	Zone 4: Considerable Prep Needed	Bachelor's Degree	None
15-1253.00	**Software Quality Assurance Analysts & Testers**	Zone 4: Considerable Prep Needed	Bachelor's Degree	None
15-1254.00	**Web Developers**	Zone 3: Medium Prep Needed	Bachelor's Degree	None
15-1255.01	**Video Game Designers**	Zone 4: Considerable Prep Needed	N/A	N/A

As shown in Figure 3 below, at least 70% of workers aged 25 and older in each software occupation hold a bachelor's degree or higher nationally.

Figure 3. National educational attainment for workers in Software occupations.



2. Data Science & AI

Data Science & AI includes roles focused on analyzing, modeling, interpreting, and presenting data to generate insights or improve systems. We identified two occupations within this domain.

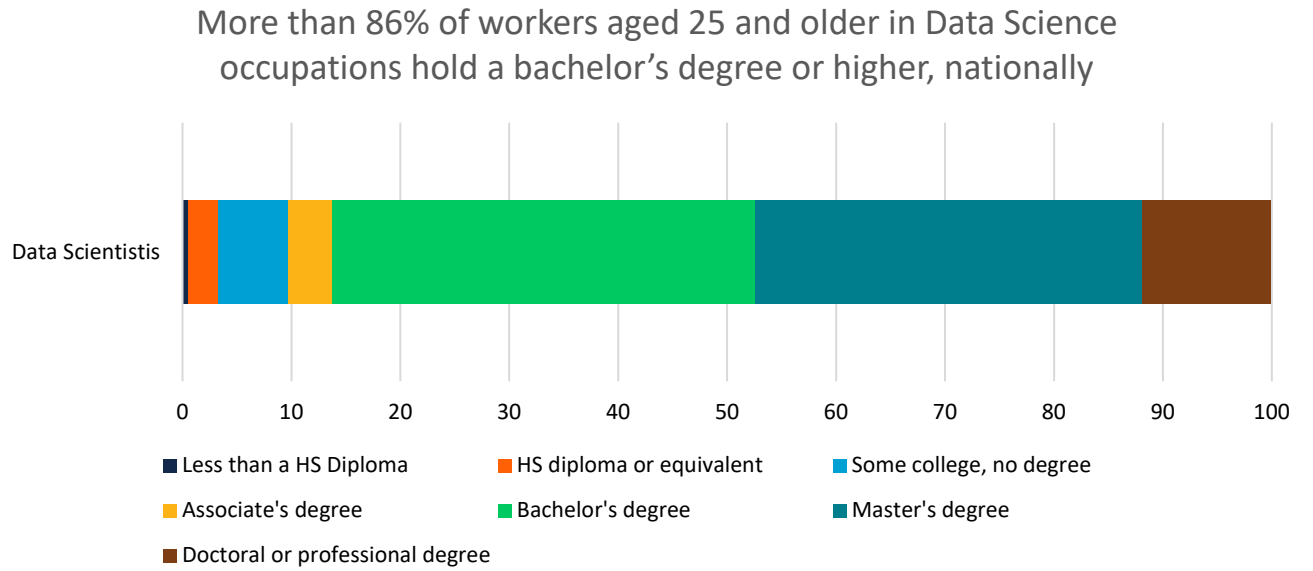
Table 3. Data Science & AI occupations and required preparation.

Code	Occupation	O*NET Job Zone	Typical Entry Level Education	Related Experience
15-2051.00	**Data Scientists**	Zone 4: Considerable Prep Needed	Bachelor's Degree	None
15-2051.01	**Business Intelligence Analysts**	Zone 4: Considerable Prep Needed	N/A	N/A

As shown in Figure 4, workers employed in Data Science roles tend to have significant levels of postsecondary educational attainment. Roughly 13% of employees possess less than a bachelor's degree,

with approximately 40%, 35%, and 11% of workers holding bachelor's, master's, and doctoral/professional degrees, respectively.

Figure 4. National educational attainment for workers in Data Science & AI occupations.



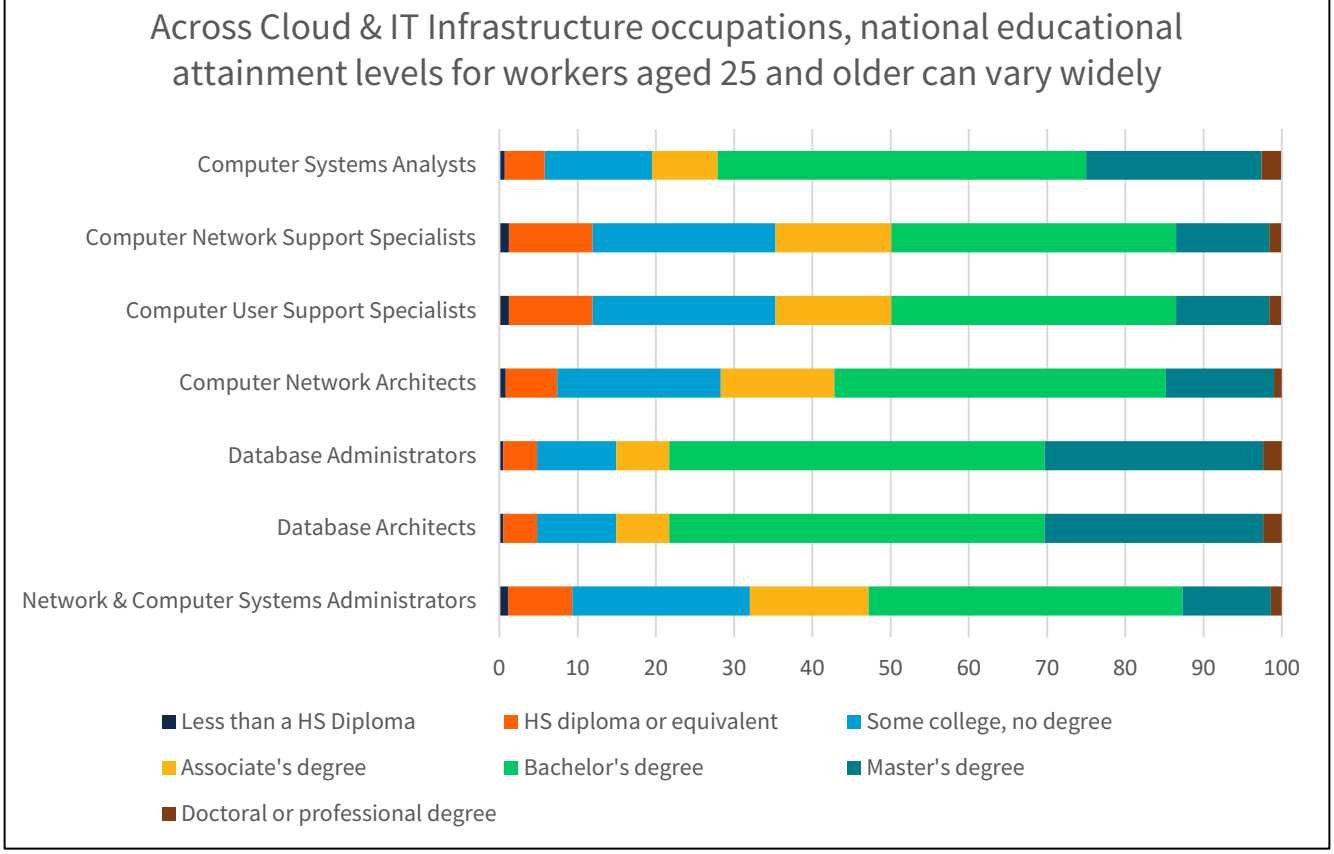
3. Cloud & IT Infrastructure

Cloud & IT Infrastructure includes roles focused on building, operating, maintaining, and supporting the systems that allow organizations to store information, connect users, and run digital services. With 10 occupations, this is the largest and most varied domain in our taxonomy, spanning user support, network and database administration, systems analysis and design, and IT leadership. O*NET classifies 7 of the 10 Cloud & IT Infrastructure occupations as requiring considerable preparation and three as requiring medium preparation. Among the seven occupations included in the BLS data, a bachelor's degree is the typical entry-level education for five. For Computer Network Support Specialists, employees typically enter with an associate's degree, while the typical educational entry point for Computer User Support Specialists is Some college, no degree. Computer Network Architects typically require five or more years of related work experience for entry, and Database Architects require less than five years. The other occupations do not typically require prior experience in a related field, although both support specialist occupations receive moderate-term on-the-job training (Table 4).

Table 4. Cloud & IT Infrastructure occupations and required preparation.

Code	Occupation	O*NET Job Zone	Typical Entry Level Education	Related Experience
15-1211.00	**Computer Systems Analysts**	Zone 4: Considerable Prep Needed	Bachelor's Degree	None
15-1231.00	**Computer Network Support Specialists**	Zone 4: Considerable Prep Needed	Associate's degree	None but there is moderate on-the-job training
15-1232.00	**Computer User Support Specialists**	Zone 3: Medium Prep Needed	Some college, no degree	None but there is moderate on-the-job training
15-1241.00	**Computer Network Architects**	Zone 4: Considerable Prep Needed	Bachelor's degree	5 years or more
15-1242.00	**Database Administrators**	Zone 4: Considerable Prep Needed	Bachelor's degree	None
15-1243.00	**Database Architects**	Zone 4: Considerable Prep Needed	Bachelor's degree	Less than 5 years
15-1243.01	**Data Warehousing Architects**	Zone 4: Considerable Prep Needed	N/A	N/A
15-1244.00	**Network & Computer Systems Administrators**	Zone 3: Medium Prep Needed	Bachelor's degree	None
15-1299.01	**Web Administrators**	Zone 4: Considerable Prep Needed	N/A	N/A
15-1299.08	**Computer Systems Engineers/Architects**	Zone 3: Medium Prep Needed	N/A	N/A

Figure 5. National educational attainment for workers in Cloud & IT Infrastructure occupations.



Current workers in Cloud & IT Infrastructure have a wider range of educational backgrounds than those in Software Development and Data Science & AI. About half of Computer User Support Specialists and Computer Network Support Specialists do not hold a bachelor's degree, including 23% who have completed some college but do not have a degree. Workers without a bachelor's degree also account for 47% of Network and Computer Systems Administrators and 43% of Computer Network Architects. About one in five workers in each of these occupations has some college education but no degree. Higher levels of education are more common among Computer Systems Analysts and workers in database occupations. Only 28% of Computer Systems Analysts and 22% of Database Administrators and Architects do not hold a bachelor's degree. This difference is partly driven by the relatively high share of workers with graduate-level education: 22% of Computer Systems Analysts and 28% of Database Administrators and Architects hold a master's degree (Figure 5).

4. Cybersecurity

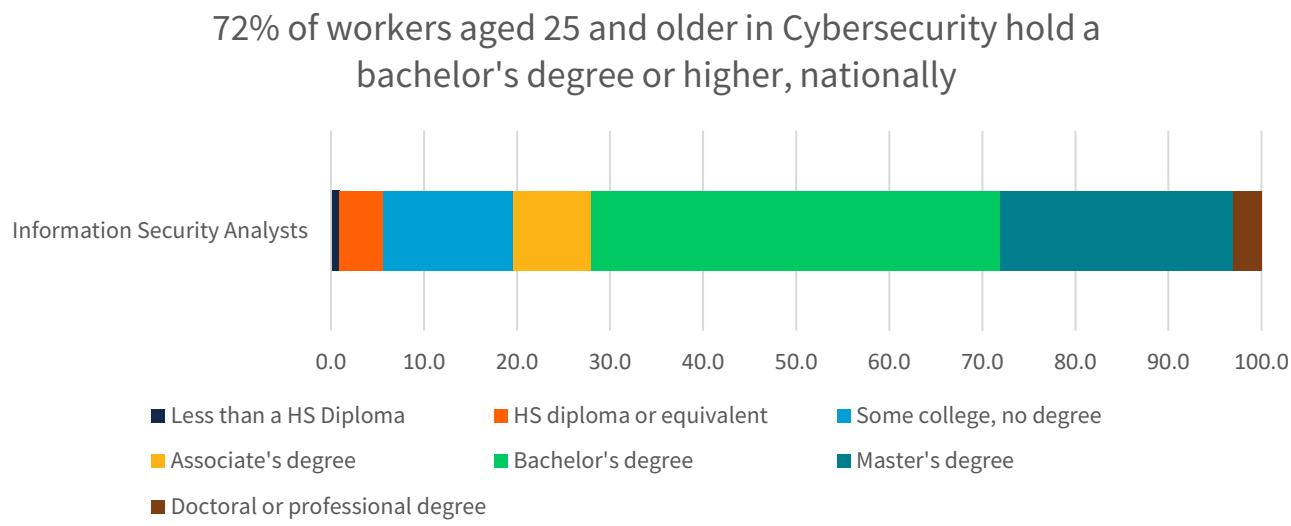
Cybersecurity includes occupations focused on protecting computer networks, systems, and information from security threats. We identified four SOC and O*NET occupations within this domain (Table 5).

Table 5. Cybersecurity occupations and required preparation.

Code	Occupation	O*NET Job Zone	Typical Entry Level Education	Related Experience
15-1212.00	**Information Security Analysts**	Zone 4: Considerable Prep Needed	Bachelor's Degree	Less than 5 years
15-1299.04	**Penetration Testers**	Zone 4: Considerable Prep Needed	N/A	N/A
15-1299.05	**Information Security Engineers**	Zone 4: Considerable Prep Needed	N/A	N/A
15-1299.06	**Digital Forensics Analysts**	Zone 4: Considerable Prep Needed	N/A	N/A

O*NET classifies all four cybersecurity occupations as requiring considerable preparation. Information Security Analysts, the only occupation in this domain included in the BLS data, typically require a bachelor's degree and less than five years of experience in a related occupation. Nearly three-quarters of current Information Security Analysts hold a bachelor's degree or higher, including 25% with a master's degree. Another 14% have completed some college but no degree, while 8% hold an associate's degree. BLS does not report separate education or work-experience requirements for the three more detailed O*NET occupations (Figure 6).

Figure 6. National educational attainment for workers in Cybersecurity occupations.



5. UI & UX Design

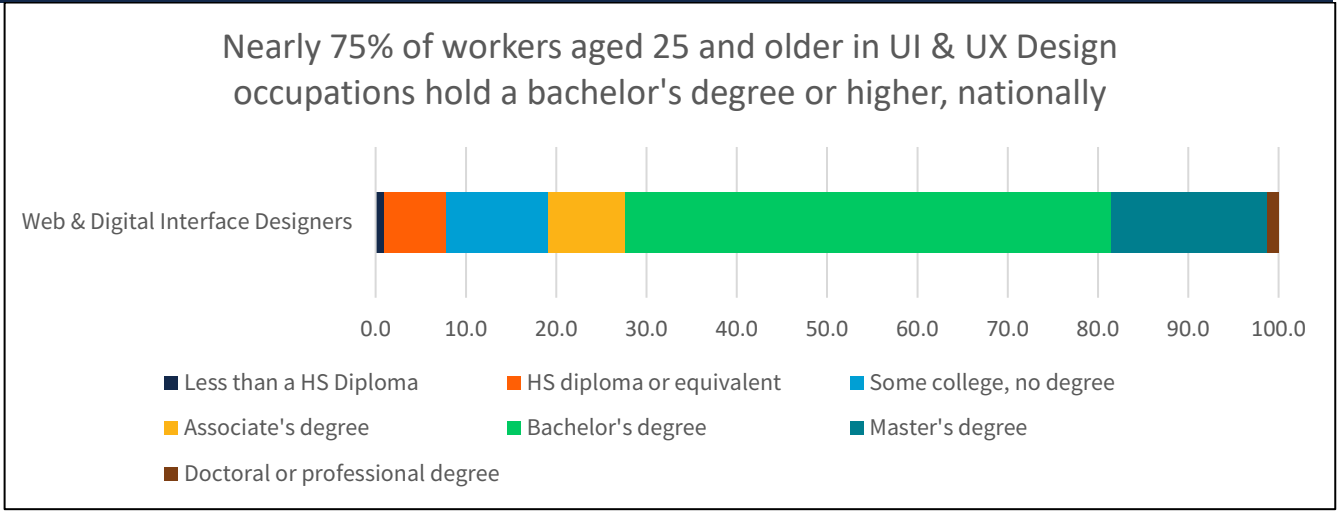
The User Interface & User Experience Design domain includes one formally classified occupation, Web and Digital Interface Designers.

Table 6. UI & UX Design occupations and required preparation.

Code	Occupation	O*NET Job Zone	Typical Entry Level Education	Related Experience
15-1255.00	**Web & Digital Interface Designers**	Zone 4: Considerable Prep Needed	Bachelor's Degree	None

In alignment with O*NET Job Zone classifications, Web & Digital Interface Designer roles require considerable preparation (Table 6). BLS analysis confirms this designation, as more than 50% of all workers in this occupation possess a bachelor's degree (Figure 7). Less than one in five workers hold a master's degree in this occupation, and approximately 27% have less than a bachelor's degree.

Figure 7. National educational attainment for workers in UI & UX Design occupations.



6. Technical Leadership & Project Management

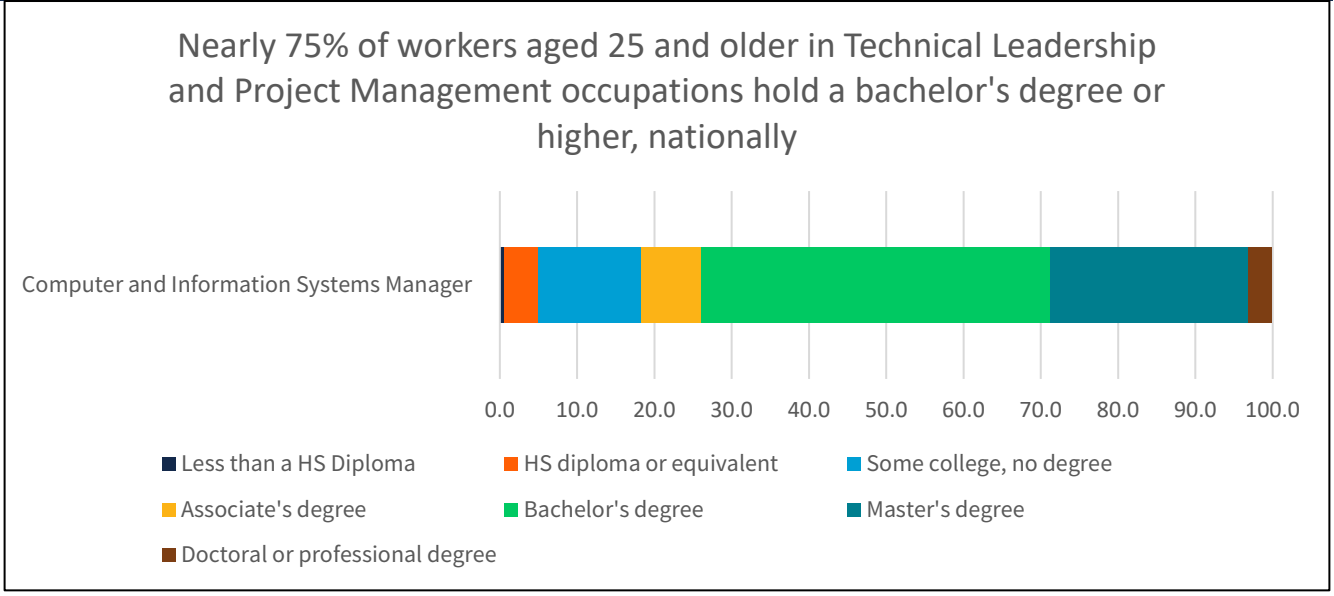
The Technical Leadership and Project Management domain includes two occupations: Computer and Information Systems Managers and Information Technology Project Managers.

Table 7. Technical Leadership & Project Management occupations and required preparation.

Code	Occupation	O*NET Job Zone	Typical Entry Level Education	Related Experience
11-3021.00	**Computer and Information Systems Managers**	Zone 4: Considerable Prep Needed	Bachelor's Degree	5 years or more
15-1299.09	**Information Technology Project Managers**	Zone 4: Considerable Prep Needed	N/A	N/A

O*NET classifies both Computer and Information Systems Manager and Information Technology Project Manager roles as requiring considerable preparation such as a bachelor's degree.

Figure 8. National educational attainment for workers in Technical Leadership and Project Management occupations.



As shown in Figure 8, workers employed in Technical Leadership and Project Management roles tend to have a bachelor's degree or higher. A little over one-quarter (26%) of employees hold less than a bachelor's degree, with roughly 45%, 25%, and 3%, of workers holding bachelor's, master's, and doctoral/professional degrees, respectively. The Information Technology Project Managers occupation is not included in the BLS analysis.

7. Emerging & Integrated Technologies

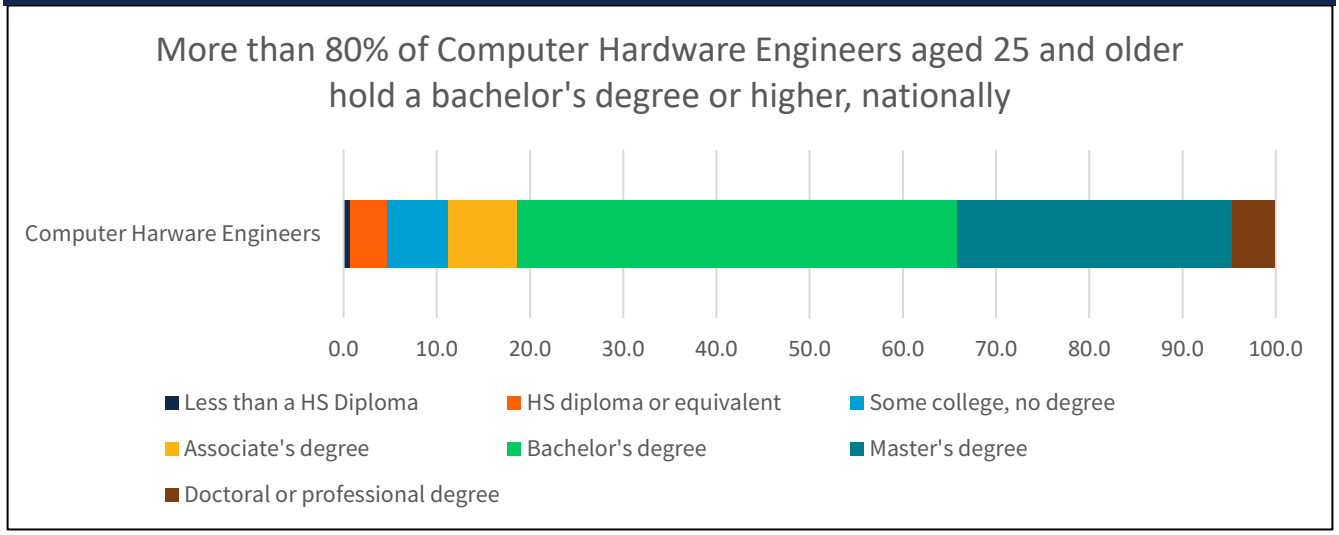
We grouped three occupations into the Emerging & Integrated Technologies domain: Blockchain Engineers, Computer Hardware Engineers, and Robotics Technicians. Their work ranges from building blockchain networks and designing computer equipment to installing, testing, and maintaining robotics and automated production systems (Table 8).

Table 8. Emerging & Integrated Technologies occupations and required preparation.

Code	Occupation	O*NET Job Zone	Typical Entry Level Education	Related Experience
15-1299.07	**Blockchain Engineers**	Zone 4: Considerable Prep Needed	N/A	N/A
17-2061.00	**Computer Hardware Engineers**	Zone 4: Considerable Prep Needed	Bachelor's Degree	None
17-3024.01	**Robotics Technicians**	Zone 3: Medium Prep Needed	N/A	N/A

Two of the three Emerging and Integrated Technologies occupations require considerable preparation, such as a bachelor's degree according to O*NET, with Robotics Technicians classified as Medium Preparation such as vocational school or on-the-job training. Computer Hardware Engineers is the only occupation analyzed in Figure 9, due to BLS data availability. Within this role, more than 80% of workers have at least a bachelor's degree, with approximately 30% holding a master's (Figure 9).

Figure 9. National educational attainment for workers in Emerging & Integrated Technologies occupations.



2a. What do these requirements reveal about opportunities for jobseekers without a four-year degree in Chicago?

We analyzed 27 occupations across 7 digital technology domains. Of these 27 occupations, only 5 (18.5%) are classified as "Job Zone 3: Medium Preparation Needed," meaning the role typically requires training in vocational schools, recognized apprenticeship, related on-the-job experience, or an associate's degree according to BLS O*NET guidelines.[12] These occupations are: Web Developers (Software); Computer User Support Specialists (Cloud & IT); Network and Computer Systems Administrators (Cloud & IT); Computer Systems Engineers/Architects (Cloud & IT); and Robotics Technicians (Emerging & Integrated Technologies). Despite their "Medium Prep Needed" classification, these roles vary in their typical entry level education and work experience in a related occupation. An additional occupation, 15-1232.00 Computer Network Support Specialists, also in Cloud & IT Infrastructure, is classified as Job Zone 4, but has a typical educational entry point at the associate's degree level according to national BLS data. In reviewing the percentage of workers in digital technology occupations who possess an associate's degree or less,[13] 15-1232.00 Computer User Support Specialists, 15-1231.00 Computer Network Support Specialists, 15-1244.00 Network & Computer Systems Administrators and 15-1241.00 Computer Network Architects are the occupations with the highest proportions of workers without a bachelor's degree, even though Computer Network Architects are classified as Job Zone 4 (Figure 10).

About associate's degrees

The purpose of this paper is to understand the role of non-degree training programs in preparing jobseekers for employment in Chicago's digital technology economy. Associate degrees and associate degree programs do not fall within our definition of non-degree pathways. However, our analysis suggests that occupations accessible to workers with some college but no degree are often the same occupations accessible to workers with associate degrees. In Figure 10, only one occupation (Computer Hardware Engineers) has a larger share of workers with associate degrees than workers with some college but no degree. Across all 16 digital technology occupations included in the BLS dataset, workers with some college but no degree represent an average of 14% of the workforce, compared with 9% for workers with associate degrees. By contrast, workers with bachelor's degrees account for an average of 46% of the workforce. Because the most

[12] See https://www.onetonline.org/help/online/zones for more.
[13] Less than a high school diploma; High school diploma or equivalent; Some college, no degree; and Associate's degree.

substantial shift in educational attainment occurs at the bachelor's degree level, we include associate degree attainment in our analysis of occupational pathways. In this context, the bachelor's degree serves as the key point of distinction between occupations that may be more accessible through non-degree pathways and those that typically require four-year degrees.

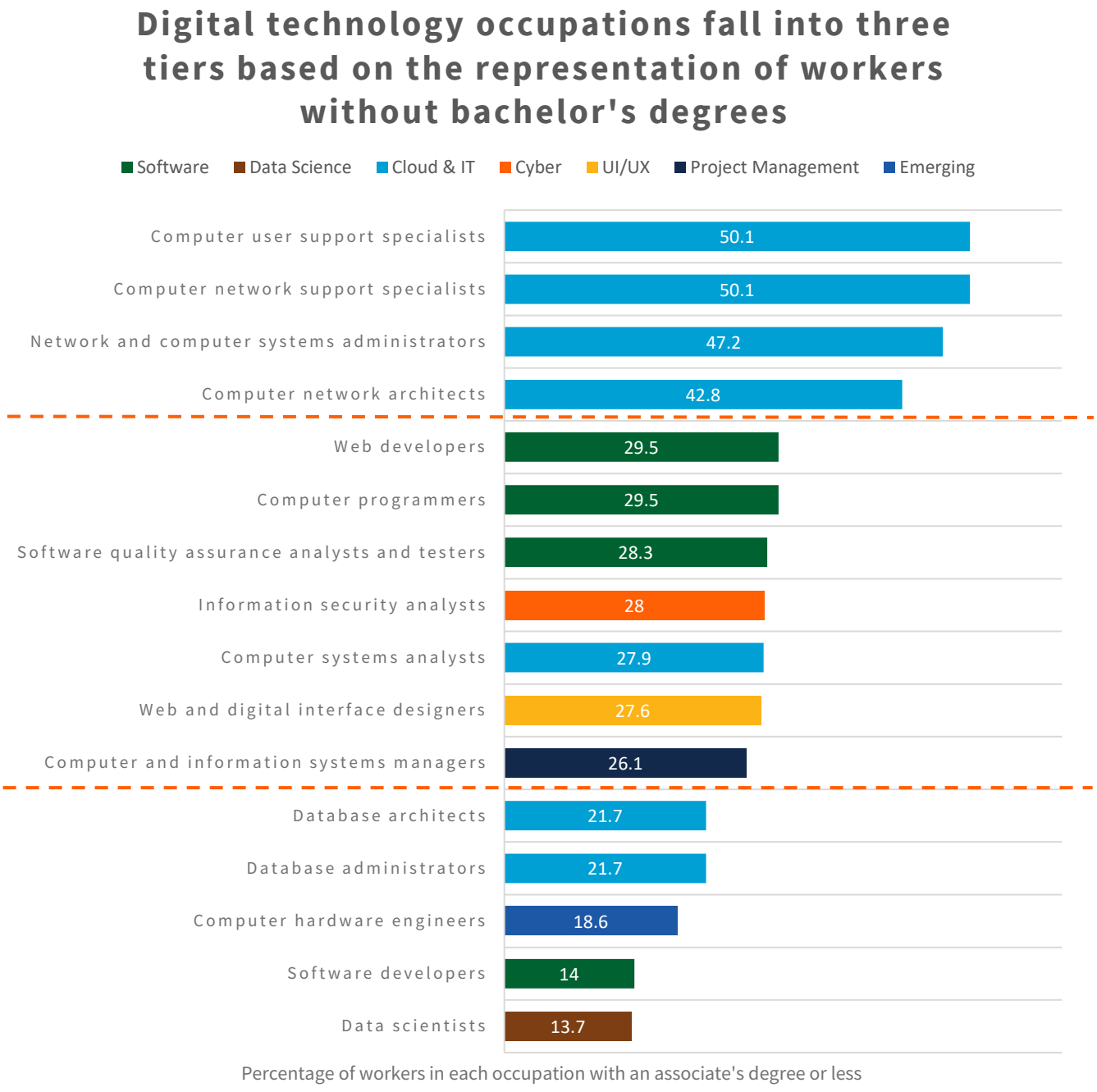
To better understand digital technology occupations from a non-bachelor's degree perspective, we plotted the combined share of workers with less than a high school diploma, a high school diploma or equivalent, some college but no degree, and an associate degree for each occupation, ordered from highest to lowest (Figure 10).

Occupational Tiers

Figure 10 shows that digital technology occupational pathways can essentially be broken into three tiers based on observed breaks in the distribution of the share of workers without a bachelor's degree (less than a high school diploma; high school diploma or equivalent; some college, no degree, and associate's degree). In Tier 1 occupations, 42%-50% of employees hold less than a bachelor's degree, making these the most accessible from an educational entry point standpoint. All Tier 1 roles are in the Cloud and IT Infrastructure domain. Tier 2 (n = 7) contains occupations wherein more than 25% but less than 30%[14] of current workers possess an associate's degree or less. These occupations span the fields of Software Development; Cloud & IT Infrastructure; Cybersecurity; User Interface & User Experience Design; and Technical Leadership & Project Management. Tier 3 occupations are the least likely to reach without at least a bachelor's degree. We note that, although the separation between the lower and middle tiers is modest in absolute percentage points, the tiers reflect meaningful differences in the prevalence of non-degree workers within an occupation and, by extension, the apparent accessibility of the occupation through non-degree pathways.

[14] The cut-off points for these tiers are based on the data presented. Alternative analytic frameworks could defensibly be applied in other occupational contexts.

Figure 10. Percentage of workers aged 25 and older without a 4-year degree in BLS digital technology occupations, nationally.



Note: Employees aged 25 years or older, nationally. Includes: Less than a high school diploma; High school diploma or equivalent; Some college, no degree, and Associate's degree. Source: https://www.bls.gov/emp/ind-occ-matrix/education.xlsx

To better make sense of how typical entry level and actual educational attainment fit together, then, we mapped each occupation by Tier (which reflects attainment) and Job Zone, Typical Entry Level Education and Related Work Experience (Table 9).

Table 9. Digital technology occupational education and experience levels by tier.

Domain	Occupation	O*NET Job Zone	Typical Entry Level Education	Related Experience
Tier 1				
Cloud & IT Infrastructure	**15-1232.00 Computer User Support Specialists**	Zone 3: Medium Prep Needed	Some college, no degree	None but there is moderate on-the-job training
Cloud & IT Infrastructure	**15-1231.00 Computer Network Support Specialists**	Zone 4: Considerable Prep Needed	Associate's degree	None but there is moderate on-the-job training
Cloud & IT Infrastructure	**15-1244.00 Network & Computer Systems Administrators**	Zone 3: Medium Prep Needed	Bachelor's degree	None
Cloud & IT Infrastructure	**15-1241.00 Computer Network Architects**	Zone 4: Considerable Prep Needed	Bachelor's degree	5 years or more
Tier 2				
Software	**15-1254.00 Web Developers**	Zone 3: Medium Prep Needed	Bachelor's Degree	None
Software	**15-1251.00 Computer Programmers**	Zone 4: Considerable Prep Needed	Bachelor's Degree	None
Software	**15-1253.00 Software Quality Assurance Analysts & Testers**	Zone 4: Considerable Prep Needed	Bachelor's Degree	None
Cybersecurity	**15-1212.00 Information Security Analysts**	Zone 4: Considerable Prep Needed	Bachelor's Degree	Less than 5 years

Cloud & IT Infrastructure	**15-1211.00 Computer Systems Analysts**	Zone 4: Considerable Prep Needed	Bachelor's Degree	None
UI & UX Design	**15-1255.00 Web & Digital Interface Designers**	Zone 4: Considerable Prep Needed	Bachelor's Degree	None
Technical Leadership and Project Management	**11-3021.00 Computer and Information Systems Managers**	Zone 4: Considerable Prep Needed	Bachelor's Degree	5 years or more
Tier 3				
Cloud & IT Infrastructure	**15-1243.00 Database Architects**	Zone 4: Considerable Prep Needed	Bachelor's degree	Less than 5 years
Cloud & IT Infrastructure	**15-1242.00 Database Administrators**	Zone 4: Considerable Prep Needed	Bachelor's degree	None
Emerging & Integrated Technologies	**17-2061.00 Computer Hardware Engineers**	Zone 4: Considerable Prep Needed	Bachelor's Degree	None
Software	**15-1252.00 Software Developers**	Zone 4: Considerable Prep Needed	Bachelor's Degree	None
Data Science & AI	**15-2051.00 Data Scientists**	Zone 4: Considerable Prep Needed	Bachelor's Degree	None

One interesting finding from Table 9 and Figure 10 combined is that the 15-1241.00 Computer Network Architects role is listed as Job Zone 4 from O*NET and also Bachelor's Degree typical educational entry, but over 40% of workers in these roles possess less than a bachelor's degree. Perhaps the Related Job Experience column holds a clue to this finding – workers without a bachelor's degree can work their way to this role through experience even if they do not come in with the requisite educational credential.

Section 3: Economic Mobility

RQ3. Which digital technology occupations show the strongest current and projected demand in the Chicago region?

Demand and Wage Data

We used Lightcast Job Openings data to examine current (2025) and future (2035) occupation demand in the Chicago-Naperville-Elgin, IL-IN Metropolitan Statistical Area (Chicago MSA). In accordance with Lightcast's methodology, "Growth captures the change in the total number of workers employed in an occupation, while replacement jobs are estimates of workers permanently leaving an occupation and needing to be replaced by new hires. A combination of both numbers indicates total Openings for the time frame" (Lightcast, 2023, para 1). Lightcast data were pulled in March 2026.

Occupation and wage data come from the BLS (U. S. Bureau of Labor Statistics, 2025d), which also uses the Chicago MSA as its geographic unit of analysis. The Chicago MSA is home to nearly 9.5 million residents (U.S. Census Bureau, 2026), making it the third-largest metro area in the United States. It spans 13 counties across both Illinois and Indiana (U. S. Bureau of Labor Statistics, 2025c).

In 2025, the Chicago MSA contained an estimated 144,351 digital tech jobs (Table 10). In the next 10 years, this number is projected to stay relatively stable, growing by just 1.1% (n = 1,600 jobs). Although Computer and Information Systems Managers (n = 21,528); Computer User Support Specialists (n = 19,574), and Computer Systems Analysts (n = 16,041) represent a sizeable share of jobs (40%), Software Developer roles (42,376) are roughly twice as numerous as even the largest among these. Together, these four occupations account for nearly 70% (n = 99,519) of all jobs in Chicago's digital technology economy. The number of Software Development and Computer and Information Systems Manager roles is projected to grow. The number of Computer Systems Analysts jobs is projected to decline marginally (1%), while more than 1,500 (8%) of Computer User Support Specialist roles are projected to disappear.

Thirteen of the 16 occupations analyzed in Table 10 are classified as National O*NET Bright Outlook occupations, which are generally expected to grow rapidly, generate large numbers of job openings, or represent emerging fields. However, projections for Chicago are more mixed, with eight of the 16 occupations examined expected to decline in the region. The largest projected declines are among

Computer User Support Specialists (-8%), Network and Computer Systems Administrators (-8%), Computer Network Support Specialists (-6%), and Computer Programmers (-6%). Information Security Analysts (+13%) and Data Scientists (+19%) are expected to experience the strongest growth.

Regarding Job Tier (Table 9), all Tier 1 occupations, which have the highest proportions of workers without bachelor's degrees, are projected to decline over the next decade (Table 10). As a result, the share of jobs represented by Tier 1 occupations is expected to decrease from 27% to 24% of the market.

Growth projections for Tier 2 occupations are more mixed. Four occupations are expected to grow, while three are projected to decline. Overall, the number of positions in this tier is expected to remain relatively stable, maintaining their current share of the market at 37%. Roles in this Tier are expected to increase by only 241 jobs over the next decade (about 1% growth overall).

Tier 3 occupations, which are the least accessible to workers without a bachelor's degree, are projected to grow by approximately 2% (n = 1,719 jobs) and expand their share of the market to 55% by 2035. Employment in most Tier 3 occupations is projected to increase or remain stable. The only exception is Database Administrators, which are projected to lose about 100 positions over the next decade.

Table 10. Number of digital tech jobs in 2025 and projected number of jobs in 2035 in Chicago MSA.

Occupation	Tier	N jobs 2025	Projected N jobs 2035	Change in N jobs 2025-2035	Percent change in N jobs	National[15] O*NET Bright Outlook
15-1232. Computer User Support Specialists	1	19,574	18,032	-1,542	-8%	No
15-1231. Computer Network Support Specialists	1	5,796	5,469	-327	-6%	Yes
15-1244. Network and Computer Systems Administrators	1	7,862	7,248	-614	-8%	No
15-1241. Computer Network Architects	1	4,956	4,866	-90	-2%	No
Tier 1 Jobs		**38,188**	**35,615**	**-2,573**	**-6.7%**	
% all		*27%*	*24%*			
15-1254. Web Developers	2	2,655	2,574	-81	-3%	Yes
15-1251. Computer Programmers	2	1,601	1,500	-101	-6%	No
15-1253. Software Quality Assurance Analysts and Testers	2	5,385	5,406	21	0%	Yes
15-1212. Information Security Analysts	2	3,919	4,444	525	13%	Yes
15-1211. Computer Systems Analysts	2	16,041	15,918	-123	-1%	Yes
15-1255. Web and Digital Interface Designers	2	2,237	2,314	77	3%	Yes
11-3021.Computer and Information Systems Managers	2	21,528	22,396	841	4%	Yes
Tier 2 Jobs		**53,366**	**54,552**	**241**	**1%**	
% all		*37%*	*37%*			
15-1243. Database Architects	3	1,280	1,305	25	2%	Yes
15-1242. Database Administrators	3	1,895	1,797	-98	-5%	No
17-2061. Computer Hardware Engineers	3	1,208	1,213	5	0%	Yes
15-1252. Software Developers	3	42,376	44,274	1,898	4%	Yes
15-2051. Data Scientists	3	6,038	7,195	1,157	19%	Yes
Tier 3 Jobs		**77,562**	**79,281**	**1,719**	**2%**	
% all		*54%*	*55%*			
Total Jobs		**144,351**	**145,951**	**1600**	**1.1%**	

[15] Bright Outlook occupations are expected to grow rapidly in the next several years, will have large numbers of job openings, or are new and emerging occupations. See: https://www.onetonline.org/find/bright?b=1

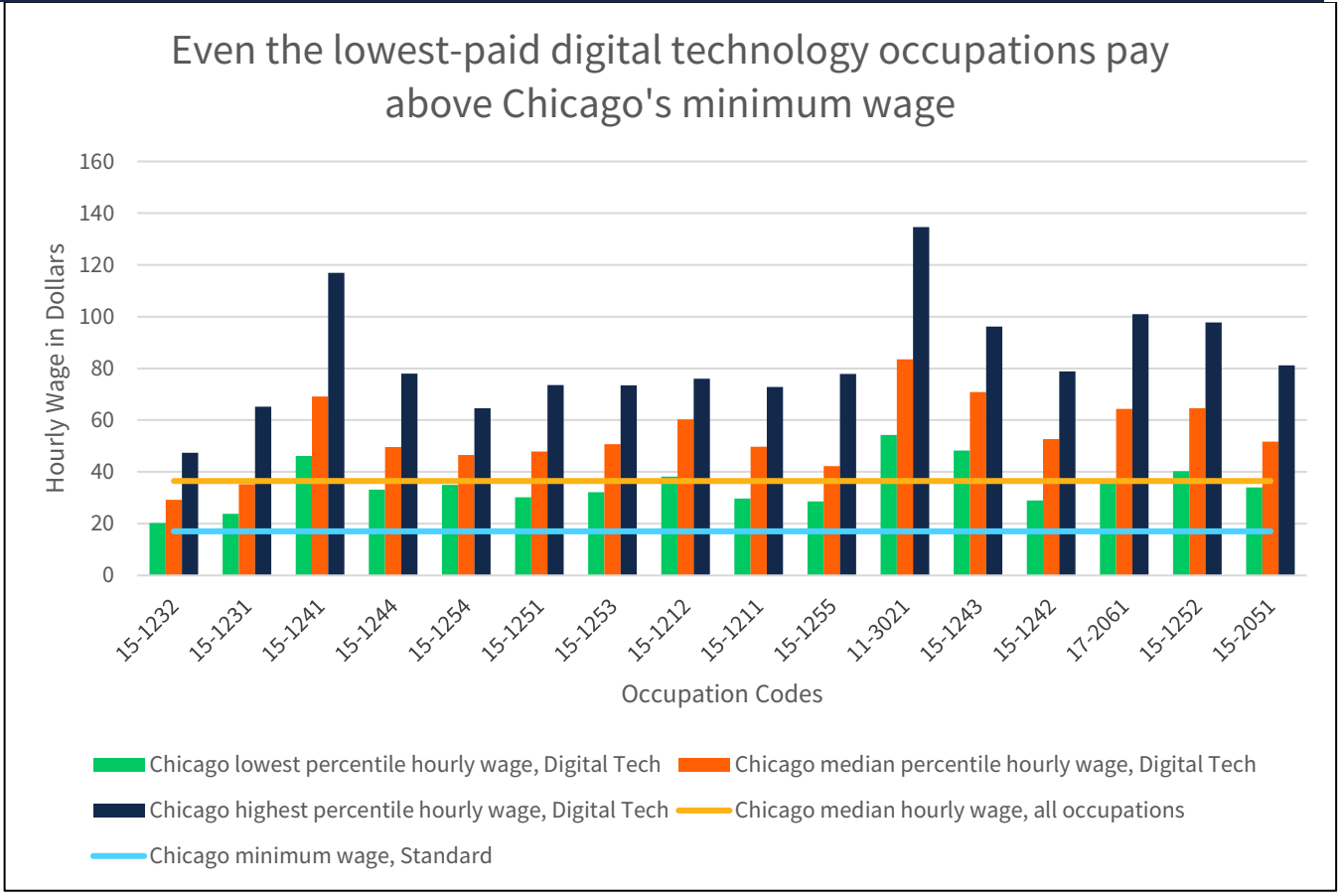
3a. Which occupations can be considered high-opportunity occupations, based on their combination of demand, wage potential, and accessibility through non-degree pathways?

Digital technology occupations in Chicago offer strong earning potential, even for workers entering through non-degree pathways. The median hourly wage across the 16 occupations analyzed is $54.29, well above the Chicago median of $36.49 across all occupations. Even at the lower end of the wage distribution, annual earnings range from about $42,200 for Computer User Support Specialists to more than $173,000 at the median for Computer and Information Systems Managers, and the lowest hourly wages in every occupation exceed Chicago's minimum wage[16] (Figure 11). See Appendix D.

Among occupations that combine relatively strong wages, projected demand, and accessibility for workers without bachelor's degrees, four stand out: Software Quality Assurance Analysts and Testers, Information Security Analysts, Web and Digital Interface Designers, and Computer and Information Systems Managers (Table 11). All are projected to maintain or increase employment over the next decade, offer median annual earnings above $87,000 and have substantial shares of workers without bachelor's degrees. Two additional occupations merit consideration despite projected declines. Computer Network Architects and Network and Computer Systems Administrators offer relatively high earnings, employ comparatively large numbers of workers without bachelor's degrees, and continue to generate notable hiring activity in the region. Although employment is projected to decrease, these occupations may remain viable pathways into digital technology careers for workers seeking opportunities outside traditional degree routes.

[16] Chicago's minimum wage is $17.05/hour standard and $12.96 for tipped employees https://www.chicago.gov/city/en/depts/bacp/supp_info/minimumwageinformation.html?os=ioxa42gdubaevcroa6&ref=app

Figure 11 . Lowest, median, and highest earnings, annual and hourly, for digital tech jobs in Chicago MSA in 2025 dollars.



Note: Lowest hourly earnings represents 10th percentile in wage dollars per hour. Median hourly earnings represent 50th percentile wage in dollars per hour. Highest hourly earnings represents 90th percentile in wage dollars per hour. *Source*: Occupational Employment and Wage Statistics (OEWS) Tables, Metropolitan and nonmetropolitan area, May 2025 https://www.bls.gov/oes/tables.htm.
Occupation codes: **15-1232**: Comp. User Support Spec.; **15-1231**: Comp. Network Support Spec; **15-1241**: Computer Network Architects; **15-1244**: Network & Computer Systems Administrators; **15-1254**: Web Devel.; **15-1251**: Comp. Programmers; **15-1253**: Software Qual. Assur. Analysts; **15-1212**: Info. Security Analysts; **15-1211**: Comp. Systems Analysts; **15-1255**: Web & Digital Interface Designers.; **11-3021**: Comp. & Info. Systems Managers; **15-1243**: Database Architects; **15-1242**: Database Admin.; **17-2061:** Comp. Hardware Engineers; **15-1252**: **Software Devel**.; **15-20151**: Data Scientists

Table 11. High-opportunity digital technology occupations in the Chicago MSA by earnings, projected job growth, and representation of workers without bachelor's degrees.

Occupation	Domain	Tier	Median annual earnings	% Workers without bachelor's	Percent change in number of jobs 2025-2026	Avg Monthly Hires (Jan 2019-Feb 2026)
15-1253. Software Quality Assurance Analysts and Testers	Software	2	$105,580	28.3%	0%	246
15-1212. Information Security Analysts	Cybersecurity	2	$125,310	28.0%	13%	168
15-1255. Web and Digital Interface Designers	UI & IX Design	2	$87,920	27.6%	3%	93
11-3021. Computer and Information Systems Managers	Technical Leadership & Project Management	2	$173,760	26.1%	4%	591
15-1211. Computer Systems Analysts	Cloud & IT Infrastructure	2	$103,490	27.9%	-1%	557
15-1241. Computer Network Architects	Cloud & IT Infrastructure	1	$143,800	42.8%	-2%	187
15-1244. Network and Computer Systems Administrators	Cloud & IT Infrastructure	1	$103,170	47.2%	-8%	263

Section 4: Training Alignment

RQ4. For which occupations do non-degree digital technology training programs in Chicago prepare jobseekers?

As highlighted throughout this report, there are myriad occupations available within the digital technology occupational landscape, but they are not equally accessible through non-degree pathways. The section below uses data from the second report of our Chicago Tech Ecosystem series to assess the alignment between the 290 non-degree training programs available in the Chicago area and the occupations that are accessible via tiered educational pathways.

Mapping Training Programs to Occupation Codes

As part of the coding process, we assigned one occupation code to each non-degree training program in our dataset. To complete this task, our research team first developed a coding rubric based on occupation descriptions compiled from BLS and O*NET. Program descriptions were collected manually from provider websites and entered individually into Microsoft Copilot Chat, Basic (University of Illinois licensed edition) along with the coding rubric, to generate an initial occupational classification for which the training program prepares learners. Specifically, we instructed Copilot to review skills, tools, key areas of competency, or even target occupations mentioned in the program description, and how well these descriptions aligned with BLS and O*NET occupation descriptions.

For example, the CCNA/A+/Net+ Program from Computer Training Source, Inc. (2026) “centers on networking setup, administration, and troubleshooting aligned with network support and entry-level network administration roles” (p. 5). This description aligns with the 15-1231.00 Computer Network Specialist role which “analyzes, tests, troubleshoots, and evaluates existing network systems, such as local area networks (LAN), wide area networks (WAN), cloud networks, servers, and other data communications networks.”[17] A review of the related CompTIA credentials[18] mentioned in the program description provide

[17] O*NET OnLine: Computer Network Support Specialists https://www.onetonline.org/link/summary/15-1231.00
[18] https://www.comptia.org/en-us/certifications/#all

and additional layer of validation. All coding decisions were reviewed by the research team to verify accuracy, ensure consistency across programs, and resolve any discrepancies.

4a. To what extent does the distribution of non-degree digital tech training programs align with high-opportunity occupations?

In Report 2, we identified 290 non-degree training digital technology programs. Nearly two-thirds of these programs align with Tier 1 and Tier 2 occupations (n = 180), with just over one-fourth of programs corresponding to Tier 3 jobs (n = 60). Fifty programs (17%) align with O*NET occupations that are not included in our Job Tier analysis (Table 12). Non-degree programs preparing Chicago jobseekers for Information Security Analyst, Network & Computer Systems Administrator, and Software Developer roles are most numerous with n = 45, n = 33, and n = 33 programs respectively. There are more than 20 programs each dedicated to Computer User Support Specialist, Computer Network Support Specialist, and Web Developer roles.

Training programs are unevenly distributed across the high-opportunity occupations identified in this study (Table 11). Information Security Analysts are well represented, accounting for 45 programs (16% of the sample), and Network and Computer Systems Administrators are associated with 33 programs (11%). In contrast, Computer Network Architects align with eight programs (3%), Software Quality Assurance Analysts and Testers and Web and Digital Interface Designers align with five programs each (2%), and Computer and Information Systems Managers align with just one program. We did not identify any programs that directly align with Computer Systems Analysts. Conversely, 33 programs (11%) prepare learners for Software Developer roles, despite these occupations having relatively low representation of workers without bachelor's degrees.

Table 12. Number of non-degree training programs in Chicago by digital technology sector.

	N Programs (% of sample)
Tier 1	
15-1232.00 Computer User Support Specialists	25 (9%)
15-1231.00 Computer Network Support Specialists	23 (8%)
15-1244.00 Network & Computer Systems Administrators	33 (11%)
15-1241.00 Computer Network Architects	8 (3%)
Total Tier 1 (% of sample)	*89 (31%)*
Tier 2	
15-1254.00 Web Developers	23 (8%)
15-1251.00 Computer Programmers	12 (4%)
15-1253.00 Software Quality Assurance Analysts & Testers	5 (2%)
15-1212.00 Information Security Analysts	45 (16%)
15-1211.00 Computer Systems Analysts	0 (0%)
15-1255.00 Web & Digital Interface Designers	5 (2%)
11-3021.00 Computer and Information Systems Managers	1 (0%)
Total Tier 2 (% of sample)	*91 (31 %)*
Tier 3	
15-1243.00 Database Architects	1 (0%)
15-1242.00 Database Administrators	6 (2%)
17-2061.00 Computer Hardware Engineers	2 (1%)
15-1252.00 Software Developers	33 (11%)
15-2051.00 Data Scientists	18 (6%)
Total Tier 3 (% of sample)	*60 (21%)*
Non-Tier	
15-2051.01 Business Intelligence Analysts	14 (5%)
15-1255.01 Video Game Designers	3 (1%)
15-1299.01 Web Administrators	1 (0%)
15-1299.04 Penetration Testers	12 (4%)
15-1299.05 Information Security Engineers	7 (2%)
15-1299.06 Digital Forensics Analysts	2 (1%)
15-1299.08 Computer Systems Engineers/Architects	2 (1%)
15-1299.09 Information Technology Project Managers	7 (2%)
17-2061.00 Robotics Technicians	2 (1%)
Total Non-Tier (% of sample)	*50 (17%)*
Total N (% of sample)	**290 (100%)**

Discussion and Considerations

In this report, we explored which digital technology occupations may provide realistic entry points through non-degree training in Chicago and how well the availability of non-degree training programs aligns with regional economic demand. We found that several Chicago digital technology occupations may offer meaningful opportunities for workers without bachelor's degrees, but those opportunities are not evenly distributed across occupational domains. Cloud and IT Infrastructure, for example, offer numerous potential avenues, whereas Software and Data Science roles are more likely to require a bachelor's degree or higher. At the same time, our analysis of occupational demand showed that many occupations most accessible to workers without bachelor's degrees are projected to decline over the next decade, while many of the occupations expected to grow have much higher concentrations of workers with bachelor's degrees or higher.

High-opportunity occupations that are high-paying, accessible without a four-year degree, and projected to experience relatively stable demand in Chicago are represented across Cybersecurity, Cloud & IT, Software, and User Experience. These opportunities, however, are not entirely aligned with Chicago's current non-degree training landscape. Some high-opportunity occupations are well represented among existing programs, particularly Information Security Analysts and Network and Computer Systems Administrators. Others have relatively few aligned programs, such as Web and Digital Interface Designers and Computer Systems Analysts. Interestingly, training programs focused on Software Developer roles are numerous despite the relatively low representation of workers without bachelor's degrees in these occupations. Program availability, in other words, does not always correspond with the occupations that appear to offer the strongest combination of accessibility, wages, and demand.

The information presented in this report provides a layer of decision-making support for learners considering non-degree educational options. Findings related to earning potential, projected demand, and typical educational requirements can help learners identify occupations that may be more accessible than others. However, these findings should be interpreted with appropriate caution given several important limitations.

For one, our study relied on labor market projections for the Chicago MSA compiled by Lightcast. And while these projections offer valuable insight into potential future trends, Lightcast represents a proprietary

source of labor market information compiled from different sources. Conducting the same projections analysis using Illinois Department of Employment Security (IDES) Economic Development Region (EDR) data, for example, could yield different results[19].

Additionally, forecasting is inherently uncertain. In a field such as digital technology, it can be difficult to predict what the labor market will look like even a few months from now, let alone ten years into the future. Mass layoffs, shifting skill priorities, and changing employer expectations have already occurred, while new job roles and specializations have yet to be fully reflected in standardized occupational classification systems. This uncertainty is made even more complicated by rapid advancements in artificial intelligence, which our analysis could not capture. It remains unclear how these technologies will reshape the digital technology workforce, particularly in a region like Chicago, where digital technology plays an important role across a diverse economy.

Contextualizing future educational requirements using current workforce educational attainment data is similarly challenging. Older workers may have entered the labor market during a period when degree requirements were less common, whereas today's workers face increasing credential expectations. That said, future workers may experience greater acceptance of non-degree pathways as skills-based hiring practices and alternative credentialing opportunities continue to expand. Relatedly, our analysis could not account for the share of workers who possess non-degree credentials in addition to some college but no degree, as these data were not available.

Another limitation is that occupation-level data were not available for all relevant digital technology occupations. Eleven occupations identified as relevant to the study could not be included in portions of the labor market analysis because comparable employment and wage data were unavailable.

The occupational alignment of training programs should also be interpreted as an approximation rather than a definitive classification. Program descriptions varied considerably in detail, and many programs could reasonably prepare learners for multiple occupations. To support analysis, each program was assigned to a single occupation based on its strongest alignment with occupation descriptions, skills,

[19] We chose Lightcast because it provides occupational projections through 2035 and uses a Metropolitan Statistical Area (MSA) geography that aligns with other data sources used in this study. For occupational projections from the Illinois Department of Employment Security (IDES) Economic Development Region (EDR) 4 for 2022-2032, see https://ides.illinois.gov/resources/labor-market-information/employment-projections.html

competencies, tools, and credentials. While all classifications were reviewed by the research team, some programs could reasonably have been classified differently under an alternative coding approach.

Our analysis also does not account for differences in employment outcomes across demographic groups, nor does it consider the relative supply of workers entering these occupations through degree and non-degree pathways, such as the number of graduates produced by relevant academic programs and non-degree training providers. Findings should therefore be interpreted as identifying areas of occupational opportunity rather than predicting labor market outcomes for specific populations or individual job seekers.

Finally, the relationship between non-degree training and occupational outcomes is more complex than occupational educational attainment alone can capture. Non-degree training programs represent different touchpoints and milestones for participants. For some learners, programs provide an opportunity to build on existing skills and expand into new roles or career paths. For others, a program may serve as a formal introduction to a long-standing interest. Program offerings are similarly diverse. Some are relatively short and culminate in an industry certification, while others carry academic credit that may be stacked into a degree program. Notably, Report 2 demonstrated substantial variation in the financial investment required from learners with fixed prices ranging from roughly $3,400 for Cybersecurity programs to more than $10,000 for Data Science programs.

Educational pathways are likewise far from straightforward. While our analysis considers educational attainment patterns within occupations, it does not assess the labor market value of specific non-degree credentials. As a result, we cannot determine whether particular certifications or credentials improve a learner's likelihood of entering these occupations. For instance, workers with some college no degree are more common in many digital technology occupations than workers with associate's degrees, but these educational attainment metrics alone cannot tell us whether completing a two-year degree offers advantages in hiring, starting salary, career advancement, or long-term earnings. Employment and earnings outcomes data for the specific Chicago non-degree training programs included in this study would also be useful context, but we do not have access to that information.

Future research should move beyond identifying where non-degree pathways appear viable and instead examine which credentials and educational experiences carry value in the labor market, for whom they create opportunities, and under what conditions those opportunities emerge.

Conclusion

This report concludes the *Chicago Tech Ecosystem* project. Building on earlier analyses of training providers and program offerings, this study examined the extent to which non-degree pathways align with digital technology occupations that offer opportunities for economic mobility in the Chicago region. As evidenced throughout the three reports in this series, Chicago has a substantial ecosystem of organizations working to grow and sustain the field of digital technology. As Chicago industries continue to rely on a skilled digital technology workforce, non-degree training programs will undoubtedly play a role in developing talent. The strength of these pathways, however, will depend largely on ecosystem partnerships and employer perceptions of non-bachelor's preparation models. In addition, continued attention to how training offerings align with a changing labor market will be key to ensuring that Chicago's digital technology ecosystem creates viable and stable opportunities for a diverse range of workers now and into the future.

References

Advance CTE. (2024). *Guidebook: The modernized National Career Clusters Framework*. https://careertech.org/wp-content/uploads/2025/06/Guidebook-National-Career-Clusters-Framework.pdf

Chicagoland Chamber of Commerce & HR&A Advisors, Inc. (2022). *The Chicago Tech Effect*. https://www.chicagolandchamber.org/wp-content/uploads/2022/06/The-Chicago-Tech-Effect-1.pdf

Crunchbase. (2026). *Crunchbase company data*. https://www.crunchbase.com/

Computer Training Source, Inc. (2026). Academic catalog: Including WIOA/TAA approved training programs. https://www.ctstraining.com/wp-content/uploads/2020/05/Academic-Catalog-2026.pdf

Lightcast (2023). Job openings data. https://kb.lightcast.io/en/articles/6957547-job-openings-data

JFF (2026). *Mapping the new digital jobs landscape: Skills, credentials, pathways*. https://www.jff.org/idea/mapping-the-new-digital-jobs-landscape

National Center for O*NET Development. (2026a). *Information security analysts (15-1212.00).* O*NET OnLine. https://www.onetonline.org/link/summary/15-1212.00

National Center for O*NET Development (2026b). *O*NET-SOC Taxonomy*. O*NET Resource Center. https://www.onetcenter.org/taxonomy.html

National Center for O*NET Development (2026c). *O*NET Online Help: Job Zones*. O*NET OnLine. https://www.onetonline.org/help/online/zones

Vaughan, J. D., Bates, M. (2026). *Chicago's non-degree digital technology training landscape: A deep dive into programs and providers*. Chicago Tech Ecosystem Series, Report 2. Chicago, IL: Illinois Workforce and Education Research Collaborative (IWERC). https://iwerc.education.illinois.edu/files/2026/10/2026_10_Chicago-Tech-Ecosystem-Report-2.pdf

U.S. Bureau of Labor Statistics. (2018). *Standard Occupational Classification*. https://www.bls.gov/ooh/computer-and-information-technology/home.htm

U.S. Bureau of Labor Statistics. (2025a). *Employment projections: Table 5.3, Educational attainment for workers 25 years and older by detailed occupation, 2023-2024 (percent).* https://www.bls.gov/emp/ind-occ-matrix/education.xlsx

U.S. Bureau of Labor Statistics. (2025b). *Employment projections: Table 5.4, Education and training assignments by detailed occupation, 2025.* https://www.bls.gov/emp/tables/education-and-training-by-occupation.htm

U.S. Bureau of Labor Statistics. (2025c). Occupational Employment and Wage Statistics: May 2025 metropolitan and nonmetropolitan area definitions. https://www.bls.gov/oes/current/msa_def.htm#IL

U.S. Bureau of Labor Statistics. (2025d). Occupational Employment and Wage Statistics (OEWS) tables: Metropolitan and nonmetropolitan area, May 2025. https://www.bls.gov/oes/tables.htm

U.S. Bureau of Labor Statistics. (2026). *Occupational Outlook Handbook: Computer and Information Technology Occupations*. https://www.bls.gov/ooh/computer-and-information-technology/home.htm

U.S. Bureau of Labor Statistics. (n.d.). *Employment projections: Employment projections data definitions*. https://www.bls.gov/ooh/computer-and-information-technology/home.htm

U.S. Census Bureau. (2022). *2022 NAICS*. North American Industry Classification System. https://www.census.gov/naics/?58967?yearbck=2022

U.S. Census Bureau (2026). *Metropolitan and micropolitan statistical area population totals and components of change: 2020-2025*. https://www.census.gov/data/tables/time-series/demo/popest/2020s-total-metro-and-micro-statistical-areas.html

World Business Chicago. (2025a). *Chicago 2050: A plan for economic growth and jobs*. World Business Chicago. https://worldbusinesschicago.com/chicago-2050-download/

World Business Chicago. (2025b). *Chicagoland industry profile: Digital tech.* https://worldbusinesschicago.com/the-research-center/

Appendix A

Table A1. Crunchbase query industry filters, Chicago-headquartered active companies.

Industry Filters Used	Agentic AI; AI Infrastructure; Android; Apps; Artificial Intelligence (AI); Blockchain; Business Information Systems; Chatbot; Cloud Computing; Cloud Data Services; Cloud Infrastructure; Cloud Management; Cloud Security; Cloud Storage; CMS; Consumer Applications; Consumer Electronics; Consumer Software; Cryptocurrency; Cyber Security; Data Center; Data Center Automation; Data Integration; Data Mining; Data Storage; Data Visualization; Database; Developer Platform; Developer Tools; DevOps; E-Learning; EdTech; Email; Embedded Software; Embedded Systems; Enterprise Applications; Enterprise Software; Facial Recognition; File Sharing; Generative AI; Human Computer Interaction; IaaS; Information Services; Information Technology; Intelligent Systems; Internet; Intrusion Detection; iOS; IT Infrastructure; IT Management; Linux; Location Based Services; Machine Learning; Management Information Systems; Metaverse; Meeting Software; Messaging; Mobile Apps; Mobile Devices; MOOC; Natural Language Processing; Network Security; Online Games; Operating Systems; PaaS; PC Games; Penetration Testing; Predictive Analytics; Presentation Software; Private Cloud; Productivity Tools; Retail Technology; SAAS; Sales Automation; Scheduling; Search Engine; SMS; Social CRM; Social Media; Software; Software Engineering; Spam Filtering; Speech Recognition; Technical Support; UX Design; Usability Testing; Video Chat; Video Conferencing; Video Games; Virtualization; VOIP; Web Apps; Web Browsers; Web Design; Web Development; Web Hosting; Web3; Wireless

Note: Search last updated in March, 2026. For Crunchbase industry definitions, see https://support.crunchbase.com/hc/en-us/articles/27690673553555-Glossary-of-Industries.

Appendix B

Table B1. List of digital tech occupations organized by industry domain.

Domain	Description	Related Occupations
Software Development	Building, testing, or maintaining software applications.	• 15-1252.00 Software Developers • 15-1251.00 Computer Programmers • 15-1253.00 Software Quality Assurance Analysts & Testers • 15-1254.00 Web Developers • 15-1255.01 Video Game Designers
Data Science & Artificial Intelligence	Analyzing, modeling, and interpreting data to generate insights or power systems.	• 15-2051.00 Data Scientists • 15-2051.01 Business Intelligence Analysts
Cloud & Information (IT) Infrastructure	Operating, maintaining, and building IT, cloud, network, and data infrastructure.	• 15-1211.00 Computer Systems Analysts • 15-1231.00 Computer Network Support Specialists • 15-1232.00 Computer User Support Specialists • 15-1241.00 Computer Network Architects • 15-1242.00 Database Administrators • 15-1243.00 Database Architects • 15-1243.01 Data Warehousing Architects • 15-1244.00 Network & Computer Systems Administrators • 15-1299.01 Web Administrators • 15-1299.08 Computer Systems Engineers/Architects
Cybersecurity	Protecting systems, networks, and data from security threats.	• 15-1212.00 Information Security Analysts • 15-1299.04 Penetration Testers • 15-1299.05 Information Security Engineers • 15-1299.06 Digital Forensics Analysts
User Interface (UI) & User Experience (UX) Design	Designing for usability and optimal user experience.	• 15-1255.00 Web & Digital Interface Designers
Technical Leadership & Project Management	Managing technical teams, systems, and projects.	• 11-3021.00 Computer & Information Systems Managers • 15-1299.09 Information Technology Project Managers
Emerging & Integrated Technologies	Frontier tech and/or specialized integration of hardware, software, connected devices, and physical systems.	• 15-1299.07 Blockchain Engineers • 17-2061.00 Computer Hardware Engineers • 17-3024.01 Robotics Technicians

Appendix C

Table C1. O*NET Job Zone, typical entry level education, and percentage of jobs at each level of education for each digital tech occupation.

Occupation	Typical Entry Level Education	Percentage of jobs with...						
		Less than high school diploma	High school diploma or equivalent	Some college, no degree	Associate's degree	Bachelor's degree	Master's degree	Doctoral or professional degree
11-3021. Computer and Information Systems Managers	Bachelor's Degree	0.6%	4.4%	13.3%	7.8%	45.1%	25.7%	23.0%
15-1211. Computer Systems Analysts	Bachelor's Degree	0.7%	5.1%	13.7%	8.4%	47.5%	22.2%	2.5%
15-1212. Information Security Analysts	Bachelor's Degree	0.7%	4.7%	14.0%	8.4%	43.9%	25.0%	3.1%
15-1231. Computer Network Support Specialists	Associate's Degree	1.2%	10.7%	23.4%	14.8%	36.4%	11.9%	1.5%
15-1232. Computer User Support Specialists	Some college, no degree	1.2%	10.7%	23.4%	14.8%	36.4%	11.9%	1.5%
15-1241. Computer Network Architects	Bachelor's Degree	0.8%	6.6%	20.9%	14.5%	42.4%	13.8%	1.0%
15-1242. Database Administrators	Bachelor's Degree	0.5%	4.3%	10.1%	6.8%	48.0%	27.9%	2.4%

15-1243. Database Architects	Bachelor's Degree	0.5%	4.3%	10.1%	6.8%	48.0%	27.9%	2.4%
15-1244. Network and Computer Systems Administrators	Bachelor's Degree	1.1%	8.2%	22.7%	15.2%	40.1%	11.3%	1.4%
15-1251. Computer Programmers	Bachelor's Degree	1.2%	6.0%	13.1%	9.2%	48.0%	19.7%	2.8%
15-1252. Software Developers	Bachelor's Degree	0.6%	2.2%	7.3%	3.9%	51.7%	30.2%	4.0%
15-1253. Software Quality Assurance Analysts and Testers	Bachelor's Degree	1.1%	5.9%	13.1%	8.2%	50.3%	19.2%	2.1%
15-1254. Web Developers	Bachelor's Degree	1.0%	5.9%	14.1%	8.5%	53.9%	15.2%	1.4%
15-1255. Web and Digital Interface Designers	Bachelor's Degree	1.0%	6.8%	11.3%	8.5%	53.9%	17.2%	1.3%
15-2051. Data Scientists	Bachelor's Degree	0.5%	2.8%	6.4%	4.0%	38.9%	35.5%	11.8%
17-2061. Computer Hardware Engineers	Bachelor's Degree	0.7%	4.0%	6.6%	7.3%	47.2%	29.5%	4.6%

Note: Employees aged 25 years or older, nationally. Sources: https://www.bls.gov/emp/ind-occ-matrix/education.xlsx; https://www.bls.gov/emp/tables/education-and-training-by-occupation.htm

Appendix D

Table D1. Median annual, and median, lowest and highest hourly earnings, for digital tech jobs in Chicago MSA in 2025 dollars.

Code	Occupation	Tier	Median annual earnings	Median hourly earnings	Lowest hourly earnings	Highest hourly earnings
15-1232	**Computer User Support Specialists**	1	60,730	$29.20	$20.29	$47.40
15-1231	**Computer Network Support Specialists**	1	73,340	$35.26	$23.88	$65.21
15-1241	**Computer Network Architects**	1	143,800	$69.14	$46.12	$117.00
15-1244	**Network and Computer Systems Administrators**	1	103,170	$49.60	$33.17	$78.02
15-1254	**Web Developers**	2	96,870	$46.57	$34.99	$64.58
15-1251	**Computer Programmers**	2	99,750	$47.96	30.21	$73.53
15-1253	**Software Quality Assurance Analysts and Testers**	2	105,580	$50.76	32.22	$73.51
15-1212	**Information Security Analysts**	2	125,310	$60.25	38.20	$76.06
15-1211	**Computer Systems Analysts**	2	103,490	$49.76	29.74	$72.83
15-1255	**Web and Digital Interface Designers**	2	87,920	$42.27	28.58	$77.91
11-3021	**Computer and Information Systems Managers**	2	$173,760	$83.54	54.32	$134.64
15-1243	**Database Architects**	3	$147,490	$70.91	48.32	$96.21
15-1242	**Database Administrators**	3	$109,680	$52.73	28.92	$78.87
17-2061	**Computer Hardware Engineers**	3	$133,860	$64.35	36.76	$101.01
15-1252	**Software Developers**	3	$134,380	$64.60	40.30	$97.79
15-2051	**Data Scientists**	3	$107,640	$51.75	34.01	$81.19

Note: Median annual earnings represent 50th percentile wage. Median hourly earnings represent 50th percentile wage in dollars per hour. Lowest hourly earnings represents 10th percentile in wage dollars per hour. Highest hourly earnings represents 90th percentile in wage dollars per hour. *Source:* Occupational Employment and Wage Statistics (OEWS) Tables, Metropolitan and nonmetropolitan area, May 2025 https://www.bls.gov/oes/tables.htm

Appendix E

Table E1. Average monthly job postings and hires for each digital tech occupation in Chicago MSA between January 2019 and February 2026.

Code	Occupation	Avg Monthly Posting (Jan 2019-Feb 2026)	Avg Monthly Hires (Jan 2019-Feb 2026)
11-3021	**Computer and Information Systems Managers**	110	591
15-1211	**Computer Systems Analysts**	340	557
15-1212	**Information Security Analysts**	85	168
15-1231	**Computer Network Support Specialists**	68	257
15-1232	**Computer User Support Specialists**	598	799
15-1241	**Computer Network Architects**	294	187
15-1242	**Database Administrators**	302	99
15-1243	**Database Architects**	322	49
15-1244	**Network and Computer Systems Administrators**	255	263
15-1251	**Computer Programmers**	54	59
15-1252	**Software Developers**	2,497	1,705
15-1253	**Software Quality Assurance Analysts and Testers**	214	246
15-1254	**Web Developers**	239	115
15-1255	**Web and Digital Interface Designers**	274	93
15-2051	**Data Scientists**	1,005	247
17-2061	**Computer Hardware Engineers**	26	34

Source: Lightcast, March 2026.