The Great Data Literacy Gap: Demand For Data Skills Exceeds Supply

Need For Data Skills Are On The Rise, Can Academia Accelerate Learning To Meet Them?

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Executive Summary

With the proliferation of data throughout enterprises and as organizations strive to become more data-driven, hiring employees with the skills to work with, interpret, and analyze data is more important than ever. Data skills are no longer exclusively needed in data scientist and IT roles — employees from across the entire enterprise need to be data literate. Therefore, as the starting point in data literacy training, academic institutions must emphasize data education for students of all academic disciplines to prepare graduates for the workforce.

Tableau commissioned Forrester Consulting to evaluate the data skills companies demand and how universities prepare students for those demands. Forrester conducted two online surveys to explore this topic. The first surveyed 156 university and academia respondents responsible for data literacy/data analytics skills curriculum, programs, and initiatives within their institutions. The second survey queried 219 hiring managers and recruiters responsible for recruiting new employees or creating job role requirements within their firms. We found that data skills are more important than ever, but supply isn't meeting demand. Academia is behind in the level at which it prepares its students.

KEY FINDINGS

› **Need for data skills has never been higher.** Data literacy is becoming increasingly vital in all positions throughout the organization, especially among entry level employees. New graduates lack the data skills needed to quickly succeed as they enter the workforce. Recruiters ranked data skill as the most in-demand skill today, as well the one that has increased in demand the most in the past two years — and it will only continue to increase over the next two years.

› **Academia needs to address this growing need.** There is an apparent disconnect in skill requirements between organizations and academia. Data skills are emphasized in workforce recruiting, but universities aren't prioritizing them. Many universities have basic math requirements, but only 48% of survey respondents report that their institutions currently have specific data skills initiatives in place. Meeting this increasing demand for data skills gives academic institutions a significant opportunity to differentiate themselves.

› **Communication between academia and enterprise is vital.** Part of the disconnect between enterprises and academia stems from poor communication. While 96% of education decision-makers report considering skills that recruiters value when designing curriculum, only 39% of respondents say they have a strong understanding of what recruiters are looking for today.

› **Data skills initiatives pay off.** Academic institutions that have data skills initiatives — especially those who train students on the most required skills — see higher job placement rates for their students. Institutions with data skills initiatives report six-month job placement rates for their students that are 11.5% higher than universities without them.
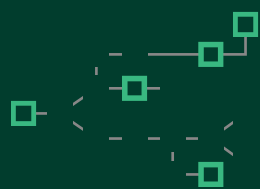
Only 48% of academic decision-makers indicated that their institution currently has specific data skills initiatives in place

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Graduates Entering The Workforce Don't Have The Data Skills They Need

Getting the right data to the right person at the right time differentiates data-driven organizations. Firms recognize that internal data may not be enough to make decisions in fast-changing environments, as evidenced by the 200% increase in venture capital funding for data marketplaces in the past two years.[1] But there's a problem. New entry-level employees all too often don't have the skills required to make the most of the data available to them.

In surveying 219 US hiring managers and recruiters, we found that:

› **Data skills are more important than ever.** Data skills have risen in importance over the past five years and the trend isn't likely to stop anytime soon. Surveyed recruiters rank data literacy as the skill highest in-demand for entry-level candidates today. It's also the skill that has grown the most in demand over the last five years and the skill that will increase the most in importance over the next five years (see Figure 1).

Recruiters rank data literacy as the highest in-demand skill for entry-level candidates today

Figure 1

Skills in highest demand	Skills that have increased most in demand over the past 2 years	Skills recruiters anticipate will increase most in importance in the *next* 5 years
1 Data skills/data literacy	1 Data skills/data literacy	1 Data skills/data literacy
2 Communication and collaboration skills	2 Project management skills	2 Communication and collaboration skills
3 Basic computer skills	3 Research skills	3 Research skills
4 Project management skills	4 Computer programming skills	4 Project management skills
5 Presentation/public speaking skills	5 Communication and collaboration skills	5 Computer programming skills

Base: 219 US hiring managers/recruiters involved with decision making regarding recruiting new employees or creating job role requirements
Note: Showing top 5
Source: A commissioned study conducted by Forrester Consulting on behalf of Tableau, January 2021

› **Data scientists aren't the only ones who need data skills.** The rise in demand for data skills is not simply demand for more data scientists and software engineers. Data literacy has become crucial across every department and role. Nearly everyone from HR and marketing to sales and customer support needs to have a solid foundation in data literacy to succeed in the modern workforce (see Figure 2).

Figure 2

"How important are data skills to each of the following departments when hiring entry-level candidates?"

■ Important/Very important

92% IT

89% Product development

86% R&D

85% Finance

77% Human resources

77% Business administration/operations

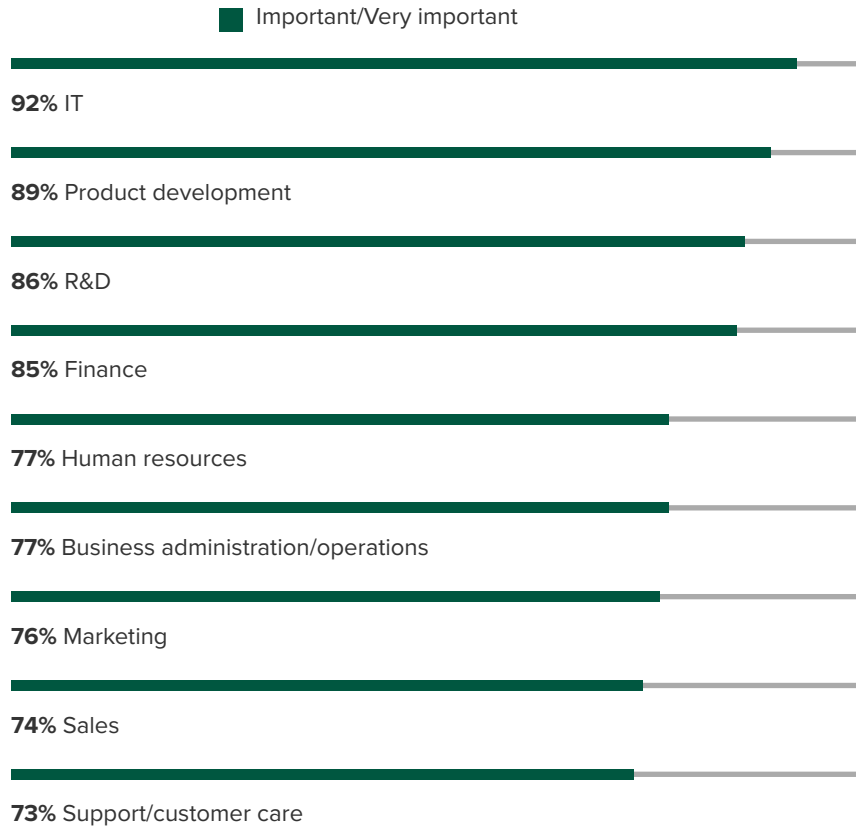**76%** Marketing

74% Sales

73% Support/customer care

Base: 37 to 125 US hiring managers/recruiters involved with decision making regarding recruiting new employees or creating job role requirements
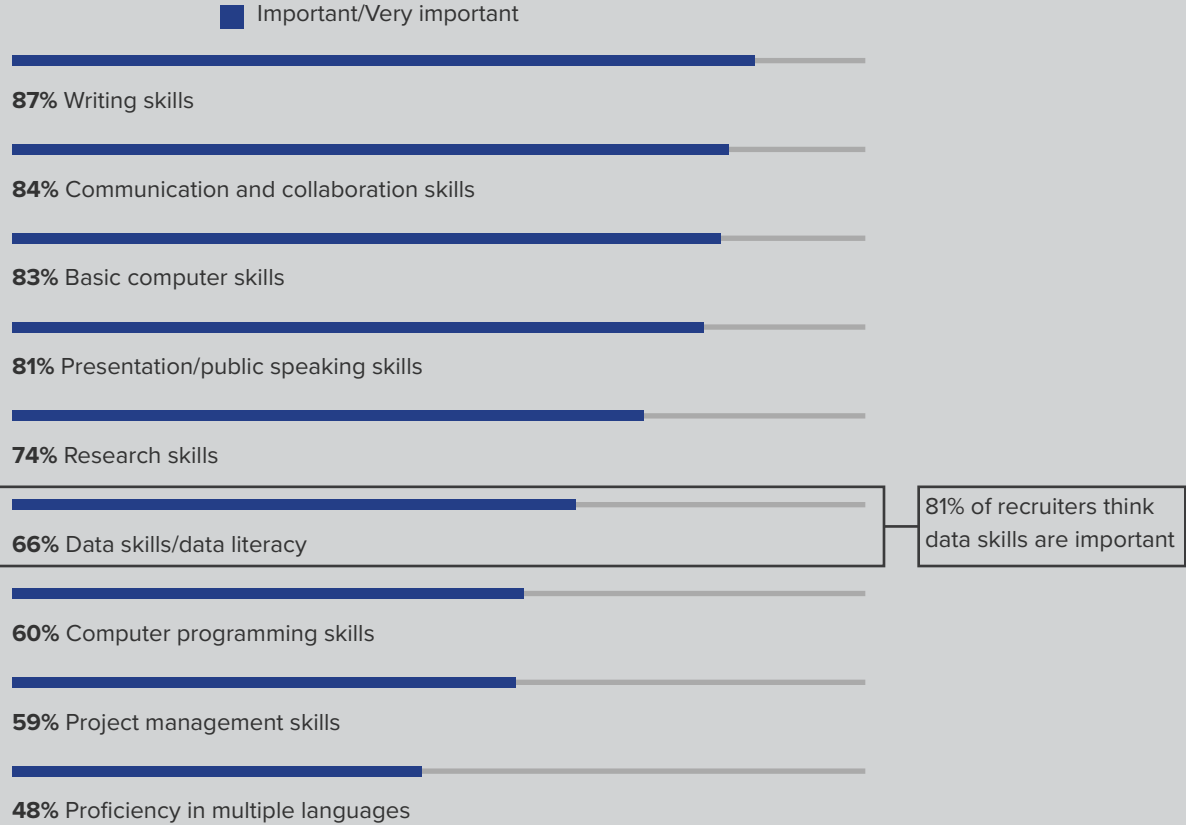Source: A commissioned study conducted by Forrester Consulting on behalf of Tableau, January 2021

Despite the high demand for data skills, when it comes to the academic institutions in charge of actually teaching these skills, there is a disconnect. In surveying 156 academic decision-makers in charge of curriculum at US institutions, programs and initiatives around data literacy and data analytics skills, we found:

› **Academia does not place the same importance on data skills as enterprise.** Academic decision-makers rate data skills far lower than recruiters when it comes to importance. Only 66% of surveyed academic decision-makers rated data skills and data literacy as important skills for their students to graduate with compared to 81% of recruiters. Data skills were behind skills in writing, communication, computers, public speaking, and research (see Figure 3). This shows a real lack of understanding of what skills students need to get hired and succeed in the modern workplace.

Figure 3

"How important do you believe it is for your students to graduate with each of the following skills?"

■ Important/Very important

87% Writing skills

84% Communication and collaboration skills

83% Basic computer skills

81% Presentation/public speaking skills

74% Research skills

66% Data skills/data literacy | 81% of recruiters think data skills are important |

60% Computer programming skills

59% Project management skills

48% Proficiency in multiple languages

Base: 156 US university/academia data literacy/data analytics skills curriculum, programs, and initiatives decision-makers
Source: A commissioned study conducted by Forrester Consulting on behalf of Tableau, January 2021

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› **Data skills are not baked into overall curricula.** While data skills were low on the list of priorities, 69% of academic decision-makers indicated that their school does have a math or statistics course — more than any other subject area. However, only 48% of academic decision-makers indicated that their institution currently has specific data skills initiatives in place and an alarming 43% report that data skills are not taught in non-math classes (see Figure 4). Many of these math requirements have been around for years. In fact, 64% of survey respondents indicated the requirements were established more than 15 years ago, so it's likely these requirements haven't been rethought lately. While there are basic math and statistics requirements in place, academic institutions need to teach data skills — and integrate them into the entire curriculum.

Figure 4

"For which of the following general skills does your institution have specific initiatives in place to teach your students?"

65% Writing skills

58% Communication and collaboration skills

57% Research skills

54% Basic computer skills

53% Presentation/public speaking skills

48% Data skills/data literacy

38% Computer programming skills

35% Project management skills

26% Proficiency in multiple languages

Base: 156 US university/academia data literacy/data analytics skills curriculum, programs, and initiatives decision-makers
Source: A commissioned study conducted by Forrester Consulting on behalf of Tableau, January 2021

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There's A Disconnect Between Enterprise Needs And Current Course Curricula

In light of the demand for data skills, there's a worrying disconnect in prioritization between academia and enterprise. Forrester found that academia's lack of focus on data skills training has resulted in underprepared graduates. The good news is that academic decision-makers actually do realize that this is an issue. Academic respondents ranked data skills second to last in a list of workplace skills that academics feel they are effectively providing their students (see Figure 5).

Figure 5

"How successful is your institution at preparing your students for the workforce with each of the following skills?"

■ Successful/Very successful

74% Communication and collaboration skills

73% Presentation/public speaking skills

71% Research skills

71% Basic computer skills

70% Writing skills

68% Computer programming skills

67% Project management skills

63% Data skills/data literacy
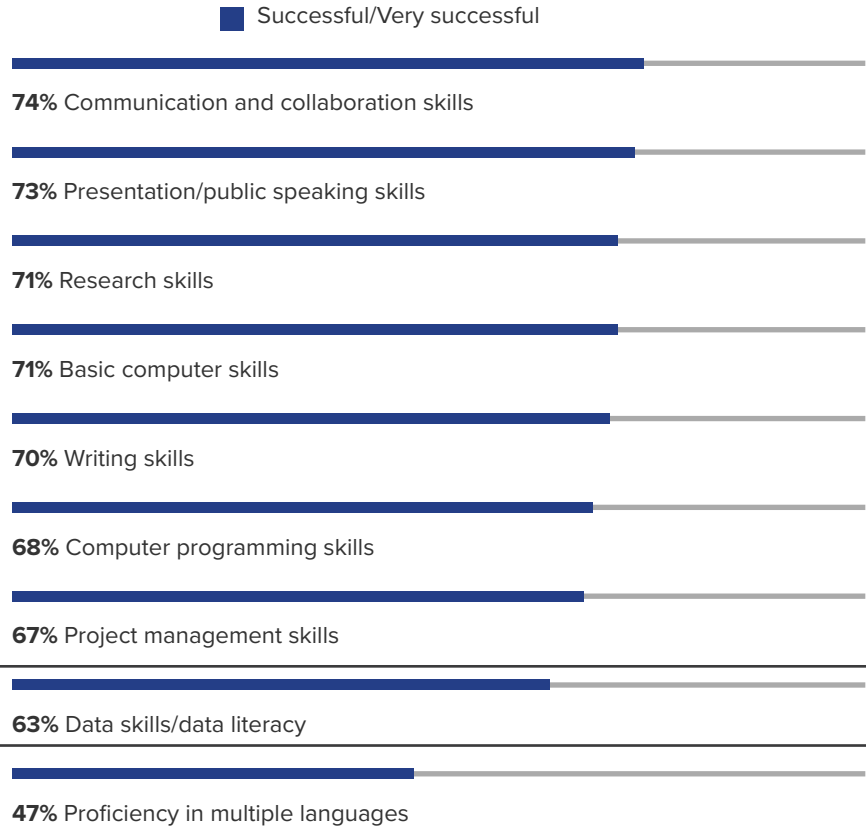
47% Proficiency in multiple languages

Base: 156 US university/academia data literacy/data analytics skills curriculum, programs, and initiatives decision-makers
Source: A commissioned study conducted by Forrester Consulting on behalf of Tableau, January 2021

Data skills also ranked second in the skills that academic decision-makers feel they need to most improve on in preparing their students. But the existing curriculum doesn't yet reflect this awareness. Why? We found:

› **The need for communication and understanding between academia and enterprise.** Much of the disconnect between academia and enterprises stems from poor communication and understanding of needs. While 96% of education decision-makers designing curriculum based on important workplace skills, only 39% say they have a strong understanding of what recruiters are looking for today. As one academic decision-maker stated: "There should be a clear communication channel between the organizations and the institutions about trending skills. It'll offer a lot of solutions naturally." There are internal communication issues academic institutions need to work out, too. Another decision-maker shared, "Most of the information that the career centers receive never trickles down to the faculty who make the curriculum decisions."

› **Challenges in gaining true understanding of students' needs.** The students at higher education institutions generally understand the importance of data skills in improving their career opportunities. In fact, 72% of recruiters report that requiring data skills makes a job more attractive to candidates, since new employees want jobs that build on hirable skills for the future. Yet only 63% of academic decision-makers report that their students think it's important to graduate with data skills. The data contradicts this idea — universities where students influence the core curriculum are nearly twice as likely to have data skills initiatives. Academic decision-makers who listen to their students' wants have a significant opportunity to differentiate their institution.

› **A lack of support and entrenched interests.** Another fundamental issue keeping institutions back in terms of data skills preparation is the slow-moving nature of academia. There are many decision-makers who understand the importance of data skills for their students, yet they struggle with institutional red tape. Academic respondents cited entrenched interests that promote existing curriculum, length of time for core curriculum to catch up with demand, and lack of budget as 3 of the top 4 issues (see Figure 6).

Only 39% say they have a strong understanding of what recruiters are looking for today.

> "There should be a clear communication channel between the organizations and the institutions about the trending skills. It'll offer a lot of solutions naturally."
>
> *Professor and core curriculum decision-maker at a large public university*

Figure 6

"Which of the following have contributed to the areas where your institution is underpreparing students?"

1	Entrenched interests that promote existing curriculum
2	Deprioritization of certain skills over others
3	Length of time required for core curriculum to catch up with demand
4	Lack of budget
5	Conflicting opinions/messaging from decision-makers

Base: 147 US university/academia data literacy/data analytics skills curriculum, programs, and initiatives decision-makers with areas where their institution is underpreparing students
Note: Showing top 5 answers
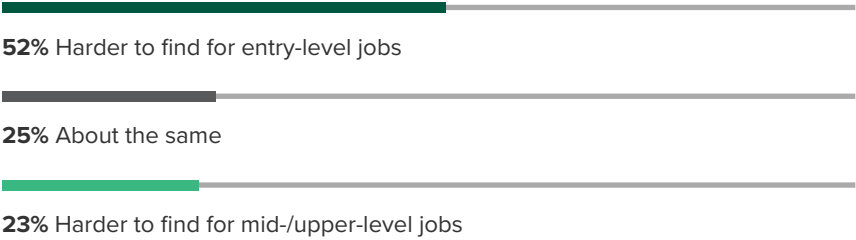Source: A commissioned study conducted by Forrester Consulting on behalf of Tableau, January 2021

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WHAT DOES THE UNDERPRERATION OF STUDENTS IN DATA SKILLS MEAN FOR ENTERPRISES?

A lack of supply of students with data skills and the high demand for those skills has resulted in a struggle to find qualified candidates. Recruiters ranked data skills as the second most difficult skill to find in entry-level candidates. Sixty percent feel that universities don't sufficiently equip students with the right data skills needed to enter the workforce. This is particularly true for entry-level candidates coming straight from university. More than half of recruiters report that data skills are harder to find in entry-level candidates than mid- and upper-level candidates (see Figure 7).

When they can't fill their recruiting pipelines with suitably qualified candidates, organizations turn to training employees in data skills. Data skills training is the second most common formal skills training courses that organizations offer. Nearly three-quarters of recruiters report that they expect to train new employees on data skills and 64% of respondents report relying on new employees with data skills to teach their colleagues who lack those skills. Organizations implementing formal training courses for data skills isn't a bad thing. Forrester considers it crucial in building an insight-driven culture.[2] But providing data training at a basic level is a waste of time and resources — especially when new employees should be learning organization-specific data skills to improve business outcomes.

Figure 7

"How difficult is it to find candidates with appropriate data skill levels for entry-level jobs compared with mid- or high-level jobs?"

52% Harder to find for entry-level jobs

25% About the same

23% Harder to find for mid-/upper-level jobs

Base: 219 US hiring managers/recruiters involved with decision making regarding recruiting new employees or creating job role requirements
Source: A commissioned study conducted by Forrester Consulting on behalf of Tableau, January 2021
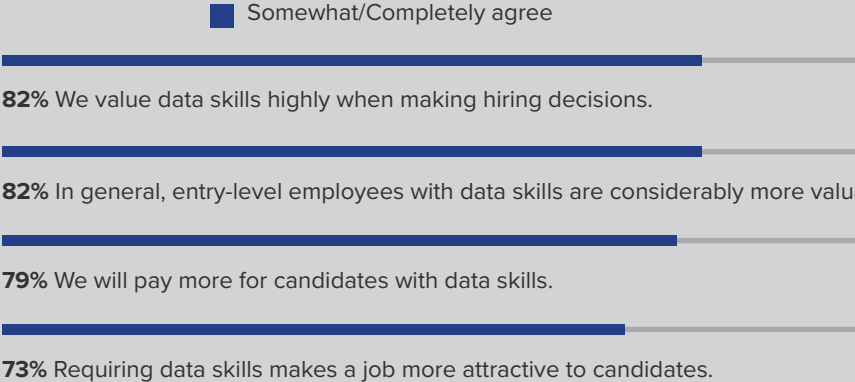
Preparing Students With Data Skills Pays Off

The benefits for students of graduating with data skills are clear. Eighty-two percent of recruiters report valuing data skills when making hiring decisions. Eighty-one percent of recruiters also report that candidates with data skills are considerably more valuable than those without and 79% of recruiters' organizations will pay more for candidates with data skills (see Figure 8). This value of data skills is seen in hiring rates and job placement rates at the institutional level. We found that:

› **Data skills initiatives increase hiring rates.** Academic decision-makers at institutions that implement a data skills training program reported a six-month student career placement rate that is 11.5% higher than those without this type of training program.

› **Software skills training are particularly valuable.** The specific data skills that students are trained in matters. Analytical and statistical software skills are a real area of need. Recruiters rated these skills as both their most important and their most difficult to find among the data skills. Because of this, it's not surprising that academic decision-makers at institutions that train their students in statistical software skills report an 18.5% increase in their career placement rates. When institutions offer both data skills initiatives and effectiveness in training in statistical software skills, academic decision-makers report a considerable 23.3% increase in average career placement rate.

Figure 8

"To what extent do you agree with each of the following statements regarding data skills at your organization?"

■ Somewhat/Completely agree

82% We value data skills highly when making hiring decisions.

82% In general, entry-level employees with data skills are considerably more valuable than those without.

79% We will pay more for candidates with data skills.

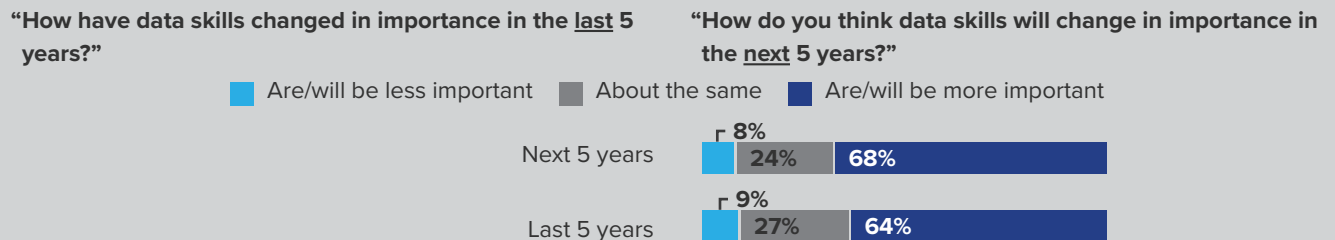**73%** Requiring data skills makes a job more attractive to candidates.

Base: 219 US hiring managers/recruiters involved with decision making regarding recruiting new employees or creating job role requirements
Source: A commissioned study conducted by Forrester Consulting on behalf of Tableau, January 2021

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WHAT'S NEXT?

As we begin to look towards the future, it does seem that academic decision-makers are starting to understand the increasing need for data skills trainings among their students. Sixty-eight percent understand that data skills have increased in importance in the last five years and 64% think that data skills will be more important five years from now (see Figure 9).

Going forward, there are numerous steps that academic institutions can take to improve their data skills training. Beyond the obvious of implementing specific programs and adding more data training into the curriculum, institutions should invest in new technology, implement extracurricular training programs, and create help centers. These initiatives represent a significant opportunity for academia as those who have adopted these programs see far greater job placement rates and set their students up for future success (see Figure 10).

Figure 9

"How have data skills changed in importance in the last 5 years?"

"How do you think data skills will change in importance in the next 5 years?"

■ Are/will be less important   ■ About the same   ■ Are/will be more important

Next 5 years	8% / 24%	68%
Last 5 years	9% / 27%	64%

Base: 156 US university/academia data literacy/data analytics skills curriculum, programs, and initiatives decision-makers
Source: A commissioned study conducted by Forrester Consulting on behalf of Tableau, January 2021

Figure 10

"What steps has your institution taken to improve its preparation of students in the areas where they need the most help?"

Difference in six-month job placement rates when implemented

Step	%	Difference
Invested in technology	47%	+17.7% ←
Added new class options	44%	+5.5%
Created a help center	42%	+13.1%
Hired new faculty	40%	+3.7%
Implemented certification courses	35%	+0.1%
Expanded professor availability/access	35%	+2.5%
Added to the core requirements	35%	+11.7%
Implemented extracurricular trainings	34%	+21.4% ←
Established new corporate partnerships	31%	+4.1%
We have not taken steps to improve in preparing students in these areas.	4%	

Base: 156 US university/academia data literacy/data analytics skills curriculum, programs, and initiatives decision-makers
Source: A commissioned study conducted by Forrester Consulting on behalf of Tableau, January 2021

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Key Recommendations

For enterprises, building an effective workforce equipped with the proper skills to succeed is no easy task. It requires input from organizations at many stages along the employee growth cycle and begins with bringing in entry-level employees with the right skills. For the academic institutions that train these entry-level employees, there's room for improvement when it comes to equipping students with the skills they need for a successful entry into the workforce. A lack of appropriate data skills is one of the biggest pain points for employers when it comes to recruiting graduates. Organizations have to train people in skills they should have at the moment they come to the door, which is frustrating. It's putting academic institutions at disadvantage, too.

Forrester's in-depth survey of academic decision-makers and recruiters about data skills preparation yielded several important recommendations:

Work on bridging the gap. Those academic decision-makers in charge of curriculum development should be in regular dialog with recruiters to ensure they understand what today's employers need, expect, and perceive as the biggest gap. This can be done informally through existing networks or via a more formal advisory panel.

Make sure that all students are data literate. If the curriculum for non-science subjects doesn't contain any modules that cover at least basic statistics and analytics skills — as well as an introduction to relevant tools — those in charge should make appropriate updates their highest priority. If you're offering math or statistics courses to non-science students already, ensure they've been updated to be fit for purpose in the current environment. Also, find opportunities to weave a data element into existing courses — all subjects have a data angle to them.
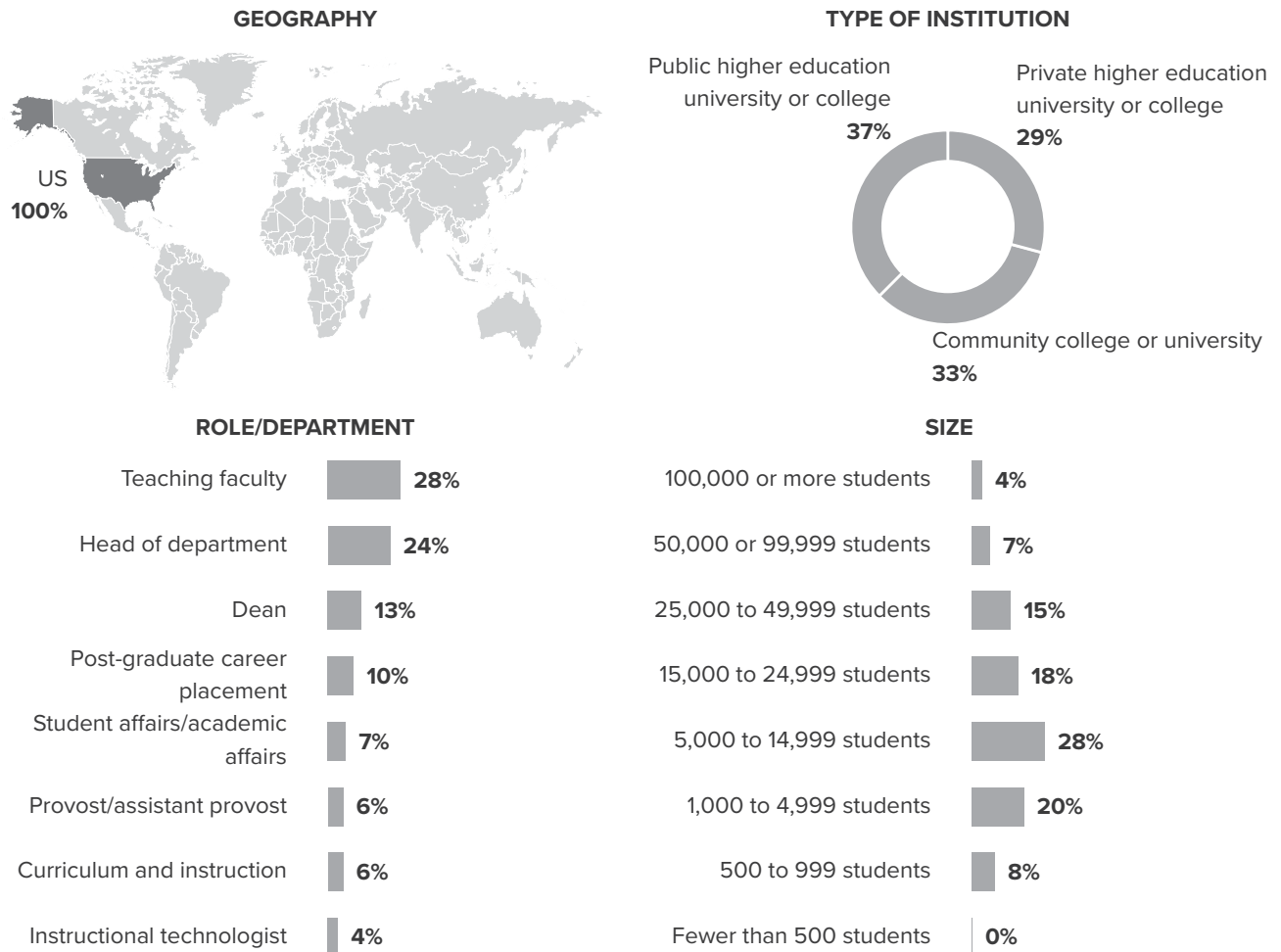
Think beyond the curriculum. Consider offering extracurricular training programs, put help centers in place, and make sure you invest in at least some of the latest technology so students will know what to expect when they enter the workforce.

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Appendix A: Methodology

In this study, Forrester conducted two online surveys to evaluate the data skills companies are demanding and how universities are preparing students for those demands. One survey with 219 hiring managers and recruiters in the US. Survey participants included decision-makers in recruiting new employees or creating job role requirements within their organizations. The second survey with 156 university and academia personnel in the US. Survey participants included decision-makers in data literacy/data analytics skills curriculum, programs, and initiatives within their institutions. Respondents were offered a small incentive as a thank-you for time spent on the survey. The studies began in December 2020 and were completed in January 2021.

Appendix B: Demographics

EDUCATOR SURVEY

GEOGRAPHY

US
100%

TYPE OF INSTITUTION

Public higher education university or college
37%

Private higher education university or college
29%

Community college or university
33%

ROLE/DEPARTMENT

Teaching faculty	**28%**
Head of department	**24%**
Dean	**13%**
Post-graduate career placement	**10%**
Student affairs/academic affairs	**7%**
Provost/assistant provost	**6%**
Curriculum and instruction	**6%**
Instructional technologist	**4%**

SIZE

100,000 or more students	**4%**
50,000 or 99,999 students	**7%**
25,000 to 49,999 students	**15%**
15,000 to 24,999 students	**18%**
5,000 to 14,999 students	**28%**
1,000 to 4,999 students	**20%**
500 to 999 students	**8%**
Fewer than 500 students	**0%**

Base: 156 US university/academia data literacy/data analytics skills curriculum, programs, and initiatives decision-makers
Note: Percentages may not total 100 because of rounding.
Source: A commissioned study conducted by Forrester Consulting on behalf of Tableau, January 2021

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EDUCATOR SURVEY

DEGREES OFFERED

Certificate program	42%
Ph.D.	20%
Master's degree	50%
Masters of Business Administration	37%
Other, more specialized four-year bachelor's degrees	31%
Bachelor of Engineering	42%
Bachelor of Science	63%
Bachelor of Arts	75%
Associate degree	65%

INFLUENCE ON PLANNING CORE CURRICULUM

Certificate program	21%
Ph.D.	7%
Master's degree	13%
Masters of Business Administration	10%
Other, more specialized four-year bachelor's degrees	10%
Bachelor of Engineering	26%
Bachelor of Science	40%
Bachelor of Arts	69%
Associate degree	60%

"To what extent do you influence or are you involved with the following processes within your organization?"

■ I am not involved   ■ I influence decisions   ■ I am part of a team making decisions for my organization   ■ I am the final decision-maker for my organization

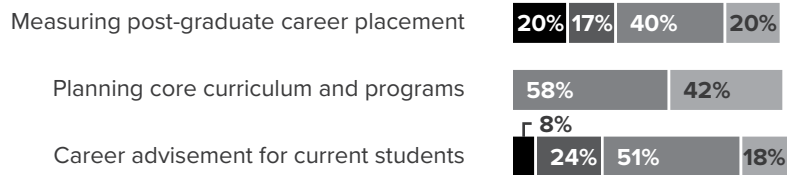|				
Measuring post-graduate career placement	20%	17%	40%	20%
Planning core curriculum and programs			58%	42%
Career advisement for current students	8% / 24%	51%	18%	

Base: 156 US university/academia data literacy/data analytics skills curriculum, programs, and initiatives decision-makers
Note: Percentages may not total 100 because of rounding.
Source: A commissioned study conducted by Forrester Consulting on behalf of Tableau, January 2021

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RECRUITER SURVEY

GEOGRAPHY

US
100%

DEPARTMENT

Human resource/training
100%

INDUSTRY (TOP 10)

Technology and/or technology services	**16%**
Retail	**9%**
Financial services and/or insurance	**9%**
Healthcare	**8%**
Manufacturing and materials	**7%**
Construction	**6%**
Business or professional services	**6%**
Telecommunications services	**5%**
Consumer product goods and/or manufacturing	**5%**
Energy, utilities, and/or waste management	**4%**

SIZE

20,000 or more employees	**6%**
5,000 to 19,999 employees	**15%**
1,000 to 4,999 employees	**32%**
500 to 999 employees	**27%**
100 to 499 employees	**16%**
2 to 99 employees	**5%**

ROLE

Director	**37%**
Manager	**38%**
Project manager	**16%**
Full-time practicioner	**9%**

Base: 156 US university/academia data literacy/data analytics skills curriculum, programs, and initiatives decision-makers
Note: Percentages may not total 100 because of rounding.
Source: A commissioned study conducted by Forrester Consulting on behalf of Tableau, January 2021
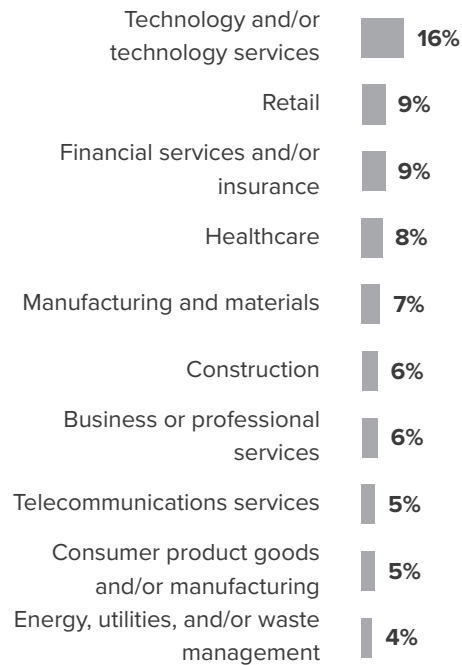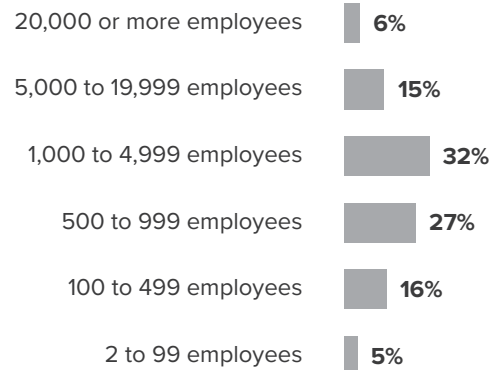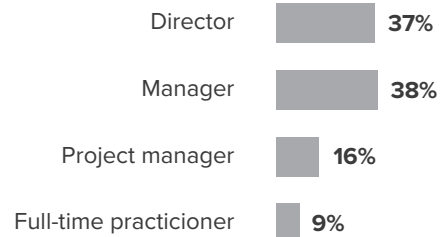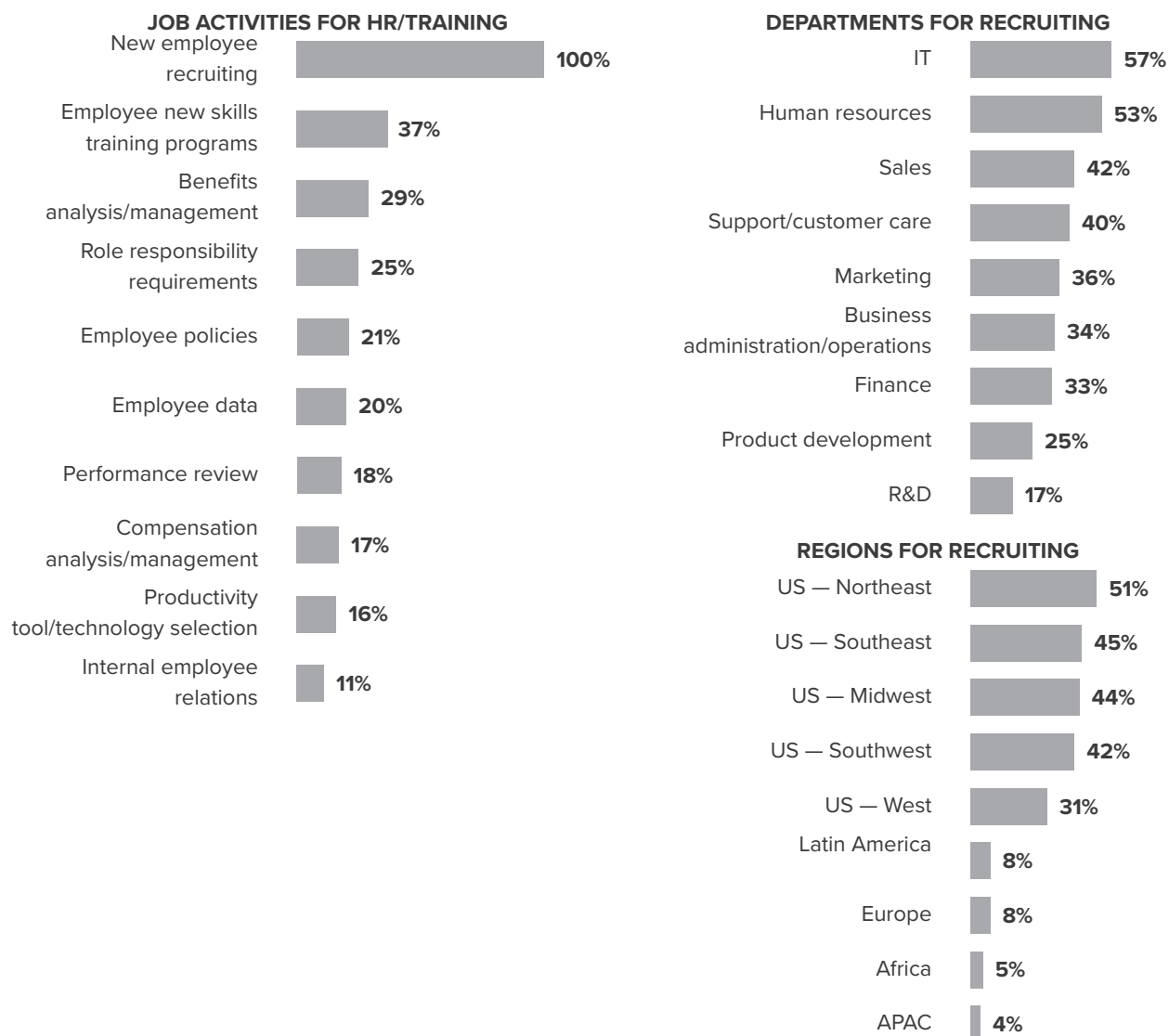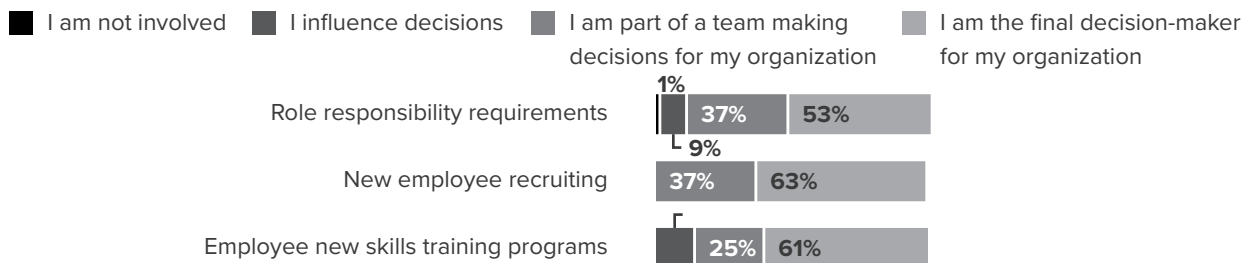
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RECRUITER SURVEY

JOB ACTIVITIES FOR HR/TRAINING

- New employee recruiting — **100%**
- Employee new skills training programs — **37%**
- Benefits analysis/management — **29%**
- Role responsibility requirements — **25%**
- Employee policies — **21%**
- Employee data — **20%**
- Performance review — **18%**
- Compensation analysis/management — **17%**
- Productivity tool/technology selection — **16%**
- Internal employee relations — **11%**

DEPARTMENTS FOR RECRUITING

- IT — **57%**
- Human resources — **53%**
- Sales — **42%**
- Support/customer care — **40%**
- Marketing — **36%**
- Business administration/operations — **34%**
- Finance — **33%**
- Product development — **25%**
- R&D — **17%**

REGIONS FOR RECRUITING

- US — Northeast — **51%**
- US — Southeast — **45%**
- US — Midwest — **44%**
- US — Southwest — **42%**
- US — West — **31%**
- Latin America — **8%**
- Europe — **8%**
- Africa — **5%**
- APAC — **4%**

"To what extent do you influence or are you involved with the following processes within your organization?"

Legend: ■ I am not involved ■ I influence decisions ■ I am part of a team making decisions for my organization ■ I am the final decision-maker for my organization

- Role responsibility requirements — 1% / 9% / 37% / 53%
- New employee recruiting — 37% / 63%
- Employee new skills training programs — 25% / 61%

Appendix C: Endnotes

[1] Source: "Data Literacy Matters: The Writing's On The Wall," Forrester Research, Inc., January 8, 2020.

[2] Ibid.

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