DATA SOCIETY®

The premiere data science training for professionals

Stealth fighter jets. Powered by data science.

How Northrop Grumman underwent a data science transformation and made the F-35 stealth fighter more reliable and cost-efficient.

Northrop Grumman

Industry: Aerospace Engineering & Defense Manufacturing
Size: $26B revenues, 70,000 employees

Company Bio
Northrop is a global aerospace technology company that manufactures a variety of aircraft and integrated software-defined systems, including flagship programs like the James Webb Space Telescope and F-35.

Overview

Problem: Northrop wanted its personnel to understand machine learning, and all technical staff to be able to implement it.

Solution: Create an Northrop data science academy with in-person, live-streaming, and online materials, with course content customized for Northrop's unique use cases. Train from basic data literacy to advanced machine learning.

Outcome: Northrop's academy graduates used machine learning techniques to reduce logistics dwell time by 90%, saved 30% on sustainment costs, and saved millions of dollars by mitigating recurring quality escapes.

> "We must apply analytics everywhere, from our products and services to engineering and manufacturing to operations and business planning. Data science helps us identify patterns, which improves the quality and speed of our decision making."
>
> *- Wes Bush, CEO*

Costs Saved	Annual Trainings Delivered	One-Time Cost Per Learner
$10,000,000+	**629**	**$1,500**

The Challenge

Northrop's CEO knew he had to adopt analytics across his company. The majority of executives surveyed by Gallup say that within two years, greater data and analytics skills will be required of *everyone* in operations, finance, accounting, marketing, and sales in their companies. And the McKinsey Global Institute found that early data science / AI adopters may enjoy an **"insurmountable advantage."**

But the job market for data scientists is stacked against firms, and do-it-yourself, pre-packaged training fails to create the community of practice that moves company culture. Northrop needed a data-driven transformation solution.

The Approach

Northrop partnered with Data Society to build a data science academy with the **modalities, curricula, and expertise** that addressed its needs.

First, Data Society designed a mixed-modality program for Northrop that combined **in-person** delivery for engagement, **live-streaming** for accessibility, and **on-demand online courses** for cost-effectiveness.

Second, Data Society met with Northrop to plan and develop a **custom curriculum based on its actual use cases**, planned engineering projects, and IT.

Third, in order to make a company-wide data-driven culture, Northrop needed a trainer with the mastery to teach **data literacy** accessibly for those new to the discipline, and also the expertise to instruct advanced subjects like **text mining** and **neural networks**.

> "At Northrop Grumman, the key to developing new capabilities in our workforce is offering employees the opportunity to build skills in new technology areas. ... Employees are motivated by the opportunity to expand their technical expertise and recognize the value of the investment that the company makes in their success."
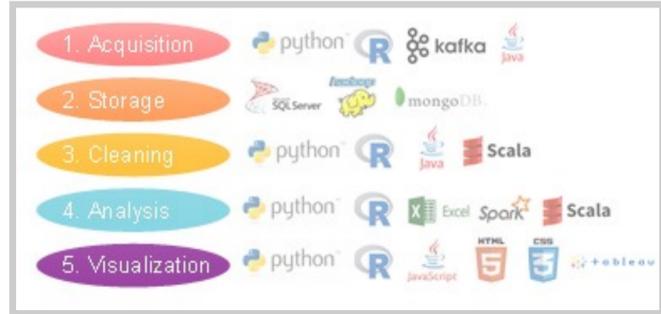>
> *- Wes Bush*
> *CEO, Northrop Grumman*

The Solution

Having leveraged Data Society's tri-modal program, Northrop's data science academy **reached its globally-distributed workforce, minimized cost, and maximized five benefits:**

1. Student-instructor interaction
2. Assistance with ongoing projects
3. Development of a community of practice
4. Developing networks within the company
5. Delivering immediately applicable skills

To ensure a relevant curriculum, Data Society custom-designed a program focused on the exact skills and technologies that Northrop's engineers needed:

1. Acquisition	python, R, kafka, Java
2. Storage	SQL Server, mongoDB
3. Cleaning	python, R, Java, Scala
4. Analysis	python, R, Excel, Spark, Scala
5. Visualization	python, R, JavaScript, HTML, CSS, tableau

To enable a company-wide transformation, Northrop leveraged Data Society's comprehensive suite of courses for staff ranging from **entry-level analysts and non-technical managers to advanced data scientists**. Topics included:

1. Data science and visualization in Excel
2. Introduction to R programming
3. Data visualization in R and dashboards in RShiny
4. Unsupervised machine learning
5. Supervised machine learning
6. Text mining
7. Neural networks for image and text analysis

Participants received **additional support from instructors after class** to guarantee that they could implement solutions in their work.

Northrop's teams also enjoyed **ongoing access to Data Society's online platform,** complete with **recorded lectures, course materials, exercises, team forums, and code banks.**

OUTCOMES

Data-driven community of practice

Northrop successfully created a data-driven culture with a tangible impact. 95% of students surveyed wanted additional data science training; 91% said that the training made them feel like Northrop was investing in their professional growth. 45% maintain regular contact with academy colleagues. And the impact...

Automated data integration reduces dwell time by 90%

After taking the academy's R course, a small team of Northrop engineers **created an RShiny tool** that automates the integration of multiple F-35 process data streams. The tool improved data fidelity and reduced supply chain dwell time by nearly 90%.

Quality escape analysis reduces sustainment cost by 30%

Quality escapes on an F-35 component were flagged by program managers as too high. So Northrop analysts teamed with shop floor engineers to **collect and assess new QA data.** Their analysis revealed a **hidden insight**: a simple adjustment to the storage and maintenance procedure could reduce the component's sustainment costs by over 30%.

"Having the tools to do what was previously unattainable, but you know is out there, is PHENOMENAL. It truly democratizes the decision making process. It will empower myself and others to make the right decisions with enough practice/refinement."

- Northrop student from Data Society's "Data Science in Excel 201" course

"I have successfully been able to merge various datasets in SQL to **look at data in ways that were never possible before.**"

- Northrop student from Data Society's "Data Science in R 101" course