



DuPont's Spark Digital Academy

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SUMMARY:

This whitepaper summarizes DuPont's efforts to launch and scale its Spark Digital Academy, the challenges it faced, and the lessons the company learned. The text relies on several interviews with DuPont's leaders responsible for the conception, launching, and management of the Digital Academy. It presents insights for other organizations to use in their digital transformation efforts.

Key take-aways

1. Build from and scale to the entire organization using existing learning and development programs.
2. Work to meet the needs of the individuals and the organization.
3. Connect digital training programs to the realities of the job market.
4. Promote the roles of executives as sponsors, students, and advocates.
5. Decide on a balance of experiential, peer, and formal instruction that works for the audience and the type of learning they seek.
6. Encourage group work in experiential projects.
7. Consider the additional workload reskilling programs bring to employees and design curriculum and program elements for flexibility.
8. Create a scalable digital infrastructure.
9. Launch a digital academy not as an isolated effort but as part of a broader digital transformation action plan.

CONTEXT

DuPont is a premier multi-industrial specialty products company based in Wilmington, Delaware. DuPont is a global innovation leader with technology-based materials, solutions, and expertise. The company has approximately 23,000 employees¹ with a presence in more than 40 countries that serves many essential and growing global markets including electronics, water, protection, industrial technologies, and next-generation automotive.

In 2020, DuPont implemented a digital transformation plan to become more innovative. Kristen Ann Kozub, Learning & Development Analyst and lead for the Spark Digital Academy, describes the goal of the Digital Academy as to “serve as a catalyst, help people transform from doing digital to being digital, and promote digital transformation across the enterprise.” The company knew its employees were critical in achieving sustained digital change. It sought to create opportunities for employees to reimagine and automate processes and create value through digital innovation.² Duncan Coffey, Information and Data Science Leader, identifies DuPont’s ambitions:

“WE RECOGNIZED THAT DIGITAL TRANSFORMATION WAS GOING TO REQUIRE THE UPSKILLING OF OUR EMPLOYEES: BOTH TO EDUCATE THEM ON THE STATE OF THE ART—WHAT IS POSSIBLE—AND TO CHANGE THEIR SKILLS.”

—Duncan Coffey
Information and Data Science Leader, DuPont

¹As of December 31, 2021, according to 2021 10-K report available at <https://www.investors.dupont.com/investors/dowdupont-investors/filings-and-reports/default.aspx>

²DuPont & RTI Innovation Advisors (2020). *Digital Transformation Case Study: DuPont*. Available at <https://www.iriweb.org/resources/dxc-case-study-digital-transformation-at-dupont/>

The Spark Digital Academy was the company's response to its growing need to create a bottom-up culture of data know how, agility, and experimentation across the organization, train workers on the use of data and digital technologies, and signal the company's priority in digital innovation. At the same time, the Digital Academy was created in response to the increasing competition to recruit technical talent and the shortage of potential employees with disciplinary and technical skills.

DuPont hoped to use the Digital Academy to advance elements of its digital transformation plan: increased use of data and digital technologies and a culture of innovation resulting in automating and optimizing processes and gaining additional insights from data across the enterprise.³ All these efforts require a workforce skilled in digital technologies, agility, experimentation, and digital resources. The Digital Academy emerged as a virtual center for learning and practicing digital technologies and supporting the digital transformation vision.

The Role of Digital Academies in the Transforming Organization

An internal organizational digital academy is a learning and development program created for reskilling and upskilling the organization's workforce on topics related to data and analytics, digital technologies (e.g., augmented reality, Internet of Things, application development, process automation), and management of digital innovation (e.g., agile processes, digital leadership). A digital academy incorporates a portfolio of learning materials and courses that are both led by an instructor and are self-paced. Curricula should include experiential (e.g., project-based) learning and promote peer learning.

As a company-wide initiative, it should aim to reach all employees and change the culture around the use of data science and digital technologies. According to Hai Zhu, Digital Technology Leader, a digital academy serves to train two primary roles, which he dubs the "citizen data scientist" and the "translator." Citizen data scientists are employees who seek in-depth data science and digital expertise that they can apply to their domains. Translators, on the contrary, are employees who want to learn the principles and application of digital to their area of expertise so that they can become translators between science, engineering, and business problems and digital solutions. Launching a digital academy responds to the traditional workforce readiness and development needs and the emerging pressures created by the digital transformation of industries and roles.

The academic literature points to a link between digital skills and capabilities and digital innovation. Companies building a digital academy pursue the strategic goal of becoming more innovative organizations, which could, in turn, positively impact their financial performance and non-financial outcomes, such as customer satisfaction and employee turnover.⁴ Companies seeking to realize value from a digital academy should consider that a successful digital transformation calls for multiple initiatives across the enterprise. Instead of a solo effort, an organization should execute a digital academy as part of a comprehensive digital transformation plan that focuses on areas such as digital infrastructure, executive support, enterprise data fragmentation, employee incentives, and policies and procedures that may impede innovation and transformation processes.

³Ibid 2.

⁴For example, see Liu, Y., Dong, J., Mei, L., & Shen, R. (2022). Digital innovation and performance of manufacturing firms: An affordance perspective, *Technovation*, 102458; or Khin, S. & Ho, T.C. (2020). Digital technology, digital capability and organizational performance: A mediating role of digital innovation, *International Journal of Innovation Science*, 11(2), pp. 177-195

Launching DuPont's Spark Digital Academy

DuPont followed an organic, bottom-up approach to launch and scale its company-wide digital academy. According to Zhu, DuPont built its digital academy following its decades-old approach to training employees in Six Sigma. As early as 2018, the company offered data science training to meet the needs of its R&D scientists and engineers across different organizations within DuPont, particularly those in the Nutrition & Biosciences Division who had to work with overwhelming amounts of data (DuPont divested its Nutrition and Biosciences business in 2021).

“WHEN THE COMPANY STARTED TO MOVE TOWARDS A NEW DIGITAL ERA, WE WERE ABLE TO LEVERAGE AND SCALE UP EXISTING RESOURCES TO CREATE A CORPORATE PROGRAM.”

— Hai Zhu
Digital Technology Leader, DuPont

The launch of a company-wide academy followed DuPont's digital transformation strategy. In early 2019, the company created a digital transformation group as a separate organizational entity designed to support and drive DuPont's digital transformation efforts. According to Zhu, the business challenges and use cases the company's executives put forth to the digital program head quickly expanded the digital value and digital awareness. The Digital Academy, which started as part of the digital transformation group, soon transitioned to an IT communications organization better suited to support it in the long term.

“THE DIGITAL GROUP HAD THE EXPERTS WHO WERE DOING THE WORK. IN MANY PROJECTS, WE HAD TO EDUCATE OUR INTERNAL CLIENTS ON WHAT DIGITAL MEANT AND WHAT WAS POSSIBLE. TRAINING BECAME AN ALL-CONSUMING EFFORT TAKING PLACE AD-HOC, FROM TIME TO TIME. WE NATURALLY STARTED THINKING ABOUT FORMING AN ACADEMY TO SYSTEMATICALLY TRAIN PEOPLE AND HELP THEM UNDERSTAND DIGITAL AND PROMOTE A DIGITAL CULTURE. AS LONG AS AN EMPLOYEE IS INTERESTED AND THE MANAGER APPROVES IT, THE EMPLOYEE CAN SIGN UP FOR ANY TRAINING.”

— Hai Zhu
Digital Technology Leader, DuPont

DuPont executives are students, sponsors, and advocates of digital training programs. The company-wide training program, since its inception, has included training on digital technologies for top executives. Duncan Coffey highlights how programs for leaders cover multiple areas, such as data science for executives, and how the executives themselves play a critical role in engaging the organization in these programs.

“PEOPLE ARE ADVOCATING FOR PROGRAMS: LEADERS WHO TAKE A COURSE AND RECOMMEND IT TO THEIR PEERS OR OTHER LEADERS WHO REPORT TO THEM, TO TAKE IT FORWARD. AT DUPONT, IT HAS NOT BEEN LIKE IN SOME COMPANIES, A TOP-DOWN “YOU MUST DO THIS” APPROACH; IT HAS BEEN MORE OF A GRASSROOTS AND “WHERE NEEDED APPLIED” EFFORT, BUT ALWAYS TRYING TO EXPAND THE AUDIENCE. THE BEST RECOMMENDATIONS ARE TYPICALLY WORD-OF-MOUTH.”

—Duncan Coffey

Information and Data Science Leader, DuPont

Scaling DuPont’s Digital Academy

Kristen Ann Kozub, also a member of the digital transformation group, led the selection of materials and their personalization for different audiences. Soon after DuPont created the Academy, the portfolio of resources expanded to incorporate self-paced online classes and new topics. Beyond data science topics for different audiences, the Academy recently added courses on robotic process automation, following DuPont’s strategic goal in that area.

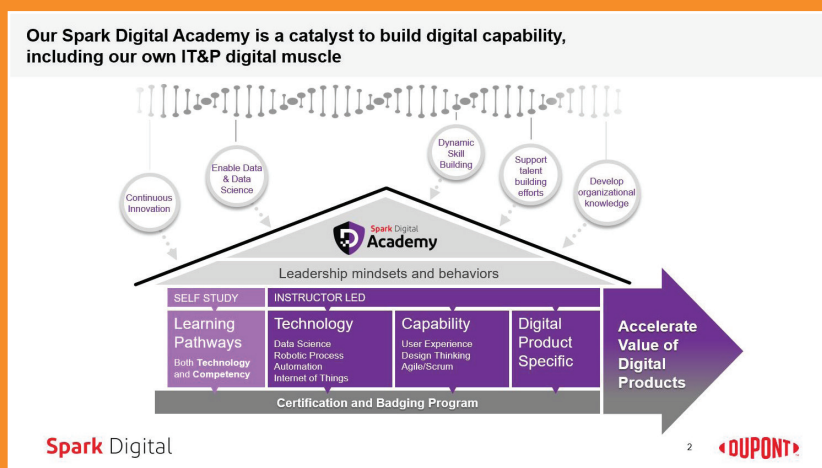


Figure 1. Overview of Spark Digital Academy

Course Offerings

At DuPont, the approach to employee development follows the 70:20:10 where 70% of the learning takes place in project-based activities related to the job, 20% of the education is self-paced and connected to peer learning in discussion boards, team exchanges, and online communities, and 10% is structured and in a traditional classroom setting. Following that learning model, DuPont’s Spark Digital Academy offers three types of resources, according to Coffey. First, it has individual self-paced courses ranging from 20-minute introductions to 8-hour detailed classes to more extensive self-paced training that includes multiple sections. “Not everything needs to

be this instructor-led content,” Coffey identifies as a lesson learned. Second, it includes curated learning paths and sequencing training materials from various sources to support learning on given topics. Third, the Digital Academy offers instructor-led courses with an experiential component. DuPont offers four courses in the instructor-led category: a four-hour course on data science for executives, a one-week data science course for project leaders or business subject matter experts, and two longer courses for aspiring data scientists who want to delve into data science as part of their role.

“THERE IS A FOUNDATIONAL COURSE FOR DATA SCIENCE, AND THEN THERE IS AN ADVANCED COURSE FOR DATA SCIENCE. EMPLOYEES TAKE THEM IN SERIES. THEY ARE TWO-WEEK COURSES, AND WE TYPICALLY REQUIRE STUDENTS TO BRING A PROJECT WITH THEM TO DO IN PARALLEL. WE WANT YOU TO APPLY WHAT YOU LEARN IMMEDIATELY, SO YOU DON’T FORGET.”

—Duncan Coffey

Information and Data Science Leader, DuPont

The Digital Academy serves to train some employees with in-depth data science and digital expertise that they can apply to their domains—what they call ‘citizen data scientists’. It also aims to educate employees and leaders on the principles and application of digital to their area of expertise to become translators between science, engineering, and business problems and digital solutions. To increase the relevance of the curricula, Zhu worked closely with vendors to develop materials and include DuPont cases. Coffey provided an example of how a data science course offered a scientist the understanding of what is possible and turned it into a data science project:

“IN A PARTICULAR CASE, A SCIENTIST WHO TOOK THE FOUNDATIONAL DATA SCIENCE COURSE AND HAD A LOT OF DATA REALIZED THEY HAD A DIFFICULT PROBLEM AND DID NOT HAVE THE TIME TO SOLVE IT. THEY KNEW HOW TO PULL THE DATA, COULD ORGANIZE THE DATA, AND COULD START THE MODELING, BUT THEY HAD A DAY JOB OF PLANNING AND RUNNING EXPERIMENTS. THEY PULLED HAI’S TEAM IN TO HELP BUILD THE MODEL AND RUN THE ADVANCED ANALYTICS. WHAT I THINK HAS HAPPENED IN THAT PARTICULAR CASE IS THEY LEARNED THE VALUE OF THE ANALYTICS, GOT THE PROJECT STARTED, AND WERE ABLE TO PROVE TO THEIR LEADERSHIP THAT THIS WOULD HAVE VALUE. THE TEAM WAS ABLE TO PULL IN THOSE EXTRA RESOURCES TO EXECUTE THE PROJECT AT A HIGHER LEVEL.”

— Duncan Coffey

Information and Data Science Leader, DuPont

Spark Digital Academy Data Science Course Details				
Title/ (Target Audience)	Contact Hours	Objectives	Class Size	Syllabus
Data Analytics for Executives (Executives, Overall Management, Business Leaders)	1 day 4 hours	<ul style="list-style-type: none"> Evaluate the difference between the types of analytics Assess the approach of data science use cases at DuPont, including timelines, requirements, roles and deliverables Interpret and prioritize use cases based on a portfolio review Evaluate elements needed to lead a digital transformation; data platforms/ capabilities 	15	Syllabus
Data Science for Business Subject Matter Experts (Project Leads, Scientists, Engineers & Technicians)	4 days 16 hours	<ul style="list-style-type: none"> Employ the correct machine learning algorithm per business challenge Identify the correct accuracy metrics suited per business challenge Distinguish key-stakeholder and end-users for your use case Estimate the impact and feasibility to prioritize use cases Apply tools and knowledge to on-board new use cases; translating business requirements Assess various stages of ideation and production and be empowered to ensure successful implementation of product(s). 	15	Syllabus
Data Science Foundation (Aspiring Data Scientists & Analysts)	8 days 32 hours	<ul style="list-style-type: none"> Understand Python to perform data analysis, visualization and data wrangling Develop the ability to apply simple models to data Illustrate work with version control tools to track changes and collaborate on code 	12	Syllabus
Data Science Advanced (Aspiring Data Scientists & Analysts)	8 days 32 hours	<ul style="list-style-type: none"> Employ Python to perform advanced machine learning Recognize basics of A/B testing and how it is applied to machine learning models Explain extending the existing Python libraries to fit custom use cases Construct and write cleaner code 	12	Syllabus

Spark Digital Academy Robotic Process Automation Course Details				
Title/(Target Audience)	Contact Hours	Objectives	Class Size	Syllabus
Blue Prism RPA Developer Foundation (Aspiring Developers)	5 days 40 hrs.	<ul style="list-style-type: none"> Understand how the Blue Prism Studio interface works and how processes are structured at the object and process level. Design and produce the logic that underpins Blue Prism processes through completion of a series of practical exercises, including queue management and exception handling. Design and build an automated solution which consolidates the core concepts learned in order to demonstrate the skills and knowledge acquired. Understand the DuPont RPA lifecycle, what the responsibilities of a Developer are within it and the documentation that they will need to produce. 	10	Syllabus
Automation Process Analyst (Aspiring Analysts)	5 days 40 hrs.	<ul style="list-style-type: none"> Learn what RPA is, how it works and what the key requirements are for a process to be considered suitable for automation. Gain experience of performing the capture and map of a process, then learning to create process documentation in a state ready for a developer to build it. Practice creating a business case for automation, taking into consideration various factors that may affect the benefit. Create project estimates & calculate ROIs. Understand the DuPont RPA lifecycle, what the responsibilities of a Process Analyst are within it and the documentation that they will need to produce. 	10	Syllabus

Figure 2. and Figure 3. Courses offered by the Spark Digital Academy.

Key Aspects of Program Design

The Academy paid close attention to program design to reach the desired outcomes. The curriculum of the instructor-led courses, from the topics to the tools they would cover, was decided in collaboration with the education partner (the Academy initially approached the education vendors with new requirements for their Biosciences R&D programs). The number of hours of instruction per day and the meeting location, following the COVID-19 pandemic, were revisited to offer flexibility to employees. Through experimentation, Kozub highlighted, they found students preferred part-time programs (ideal for course-takers to complete homework activities). Also, with flexibility in mind, the Academy offered online programs in different regional time zones (e.g., North America and Asia-Pacific). Another course design element DuPont paid attention to was the classroom size so that they could ensure quality interactions between the instructor and the students. While online self-paced content was available during the year, the Academy scheduled instructor-led courses between two and four times per year to meet demand.

When selecting course instructors, DuPont used internal employees with domain expertise and external facilitators on the topic of interest. Kozub shared arguments for seeking outside expert facilitators:

“ALTHOUGH WE HAVE AMAZINGLY TALENTED PEOPLE AND HIGHLY EDUCATED PEOPLE AT DUPONT, IT’S A MATTER OF BANDWIDTH. ANYTIME YOU FACILITATE AND PREPARE FOR A COURSE, IT TAKES A LOT OF TIME TO PREPARE. I THINK THAT IT’S GOOD TO HAVE THAT OUTSIDE PERSPECTIVE FROM EXTERNAL FACILITATORS AS WELL BECAUSE THEY COME WITH A VERY BROAD PERSPECTIVE OF OTHER COMPANIES AND THINGS THAT THEY HAVE LEARNED; IT ENHANCES THE PARTICIPANT’S LEARNING, AND THAT’S JUST NOT SOMETHING THAT YOU CAN DO FROM THE INSIDE. THE USE OF FACILITATORS ALSO FEEDS INTO THE OVERALL COURSE SATISFACTION.”

—Kristen Ann Kozub
Learning and Development Analyst, DuPont

The Academy implemented an internal certification program and badging system to increase course engagement. Employees who complete a course earn badges that they can display on their email signature and LinkedIn™ profile. Badges and certificates recognize the time commitment of course takers and increase awareness about offerings across the company.

Technology Infrastructure

The Academy relies on existing information technology infrastructure—Microsoft SharePoint—to curate and present employee content and training opportunities. At the same time, they use open-enrollment communications and periodic emails to inform the DuPont community about training opportunities, particularly the instructor-led courses.

The latest courses on robotic process automation include hands-on activities on cloud servers, which allows students to complete daily activities.

Metrics

The Digital Academy records the number of sign-ups for in-person courses—they believe the Academy and employees have a shared understanding of the value of the training, so they do not need to track (or mandate) the completion of courses. Since 2021, more than 500 employees have participated in instructor-led courses.

The Academy asks course participants to complete a concise satisfaction survey capturing their willingness to recommend the course to their peers (on a five-point Likert scale), a typical customer satisfaction metric, and collects open-ended feedback. Feedback after the course, Kozub shared, is used to adjust their design (e.g., the number of contact hours per day).

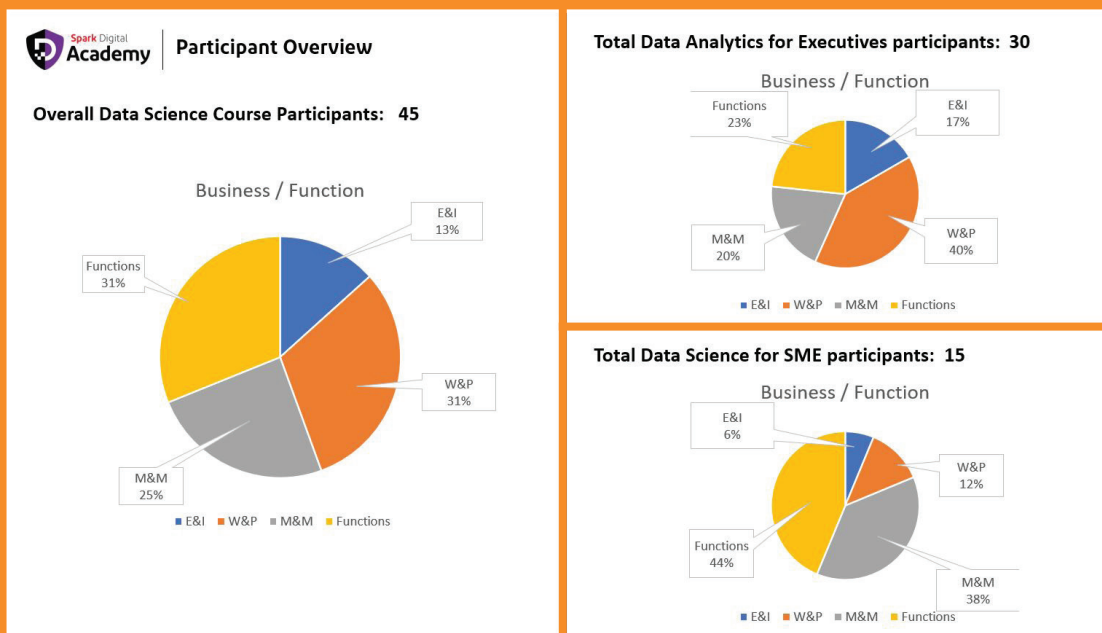


Figure 4. Course participants are broken down by business/function and also their role in the organization.

Plans for DuPont's Spark Digital Academy

In fall 2022, The Digital Academy, Coffey shared, continued to add content in popular areas. Two objectives of the Digital Academy are scaling participation through peer learning and offering digital infrastructure to support continued exploration. To bolster capabilities through peer learning, the Academy built communities of practice that can provide peer support on key topic areas. For example, they created a mentor-mentee program to support continued development work for those who have completed the new robotic process automation course. Also, they are developing a data science portal, shared workspaces, and other digital infrastructure resources to provide access to computing power and allow graduates to do advanced work.

Lessons and Opportunities for Launching and Growing a Digital Academy

Creating and scaling DuPont's Digital Academy offers insights that may serve other organizations:

- 1. Build from and scale to the entire organization using existing learning and development programs.** Capitalize on existing resources created for the organization.
- 2. Work to meet the needs of the individuals and the organization.**
A digital academy should serve not only practitioners but project leaders and executives. Early on, seek to connect and learn about the digital needs of different target audiences in the organization to design courses. While scientists and engineers need to know how to design and develop digital solutions and analytics models, executives and project leaders want to understand the terminology and gain awareness of data science's and digital technologies' impacts on the business.
- 3. Connect digital training programs to the realities of the job market.** A digital academy can help train new hires with domain expertise who lack the digital skills needed in their new roles. External facilitators are particularly useful in bringing a market perspective to programs.
- 4. Promote the roles of executives as sponsors, students, and advocates.** Executives should become promoters that encourage and support other staff wanting to take courses from the digital academy and apply the learnings to projects in their jobs. Instead of a top-down approach to enforcing the programs, seek internal advocacy. Incentivize with certificates of accomplishments around a topic area.
- 5. Decide on a balance of experiential, peer, and formal instruction that works for the audience and the type of learning they seek.** Pay attention to self-paced content—not everything has to be instructor-led—and the value of experiential learning tied to the employees' roles. When possible, offer cases and content linked to the organization. Employees with little or no experience with digital technologies may benefit from more direct instruction and guided activities. At the same time, advanced groups working on experiential projects may make the most of peer learning and open-ended project work.
- 6. Encourage group work in experiential projects.** Group work is important to replicate team innovation dynamics. Encourage people from the same research group to sign-up for instructor-led courses with experiential components.
- 7. Consider the additional workload reskilling programs bring to employees and design curriculum and program elements for flexibility.** Part-time programs that span extended periods (e.g., several weeks) will allow participants to complete homework and project activities. Similarly, when identifying instructors for live courses, consider using external facilitators with expertise in the area instead of relying on employee-instructors.
- 8. Create a scalable digital infrastructure** (e.g., virtual desktops with data science environments) to support computing needs and continued exploration.
- 9. Launch a digital academy not as an isolated effort but as part of a broader digital transformation action plan.**

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