Data Science & AI Academy

How the Novartis Capability Team Scaled Their Data Training

Datacamp Webinar

Kemi Phillips, Head of Capability Building, Data Science and AI
Novartis - London
July 2022

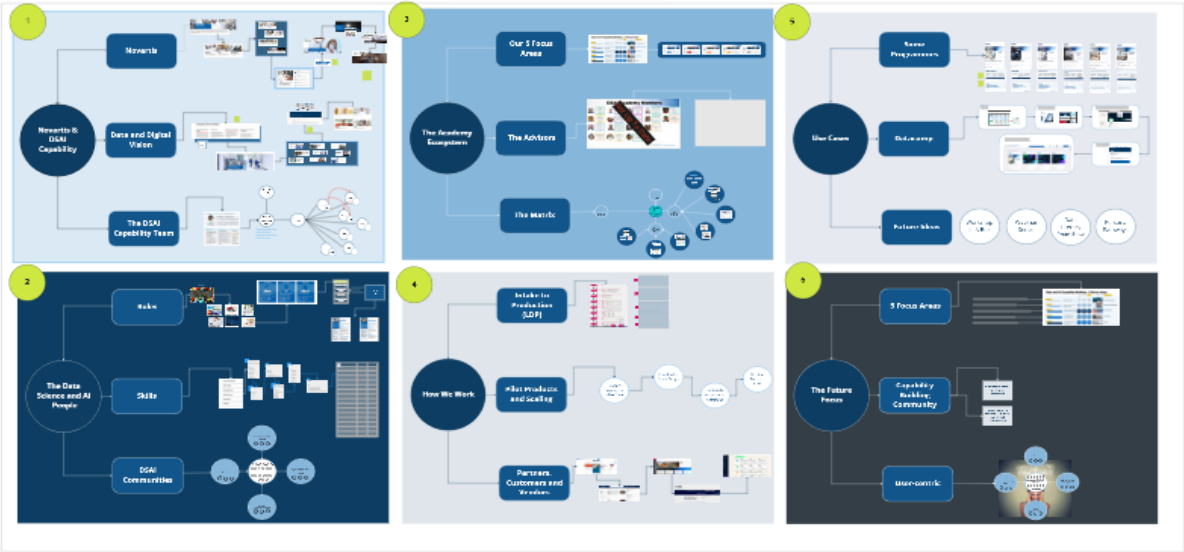
NOVARTIS | Reimagining Medicine

Abstract

The Novartis Data Science and Artificial Intelligence (DSAI) Academy uses DataCamp to train thousands of employees in data skills as part of an organization-wide data transformation program to "Go Big on Data and Digital".

In this webinar, Kemi Philips, Head of Capability Building - Data Science and Artificial Intelligence, presents her story of running a large-scale data academy. She discusses the challenges and successes of the program, along with practical tips for how to scale training at your organization.

1		5 mins
2		5 mins
3		5 mins
4		5 mins
5		10 mins
6		5 mins



Data Science & AI Academy

1

About Novartis and The DSAI Team
1. Novartis as an organisation
2. The Data and Digital Strategy
3. The DSAI Team and Network

5 mins

2

About Data Science in Novartis
1. DS roles
2. DS Skills
3. DS Communities

5 mins

3

The DSAI Ecosystem
1. The DSAI Academy
2. Our 5 Focus Areas
3. The Matrix

5 mins

4

How We Work
1. Intake to production - Learning Design Process
2. Pilot Products and Scaling
3. Partners, Customers and Vendors

5 mins

5

Some Use Cases (use of Datcamp included here) - 15 mins
1. Current pilot programmes
2. Datacamp Use Cases
3. Future ideas not yet worked on

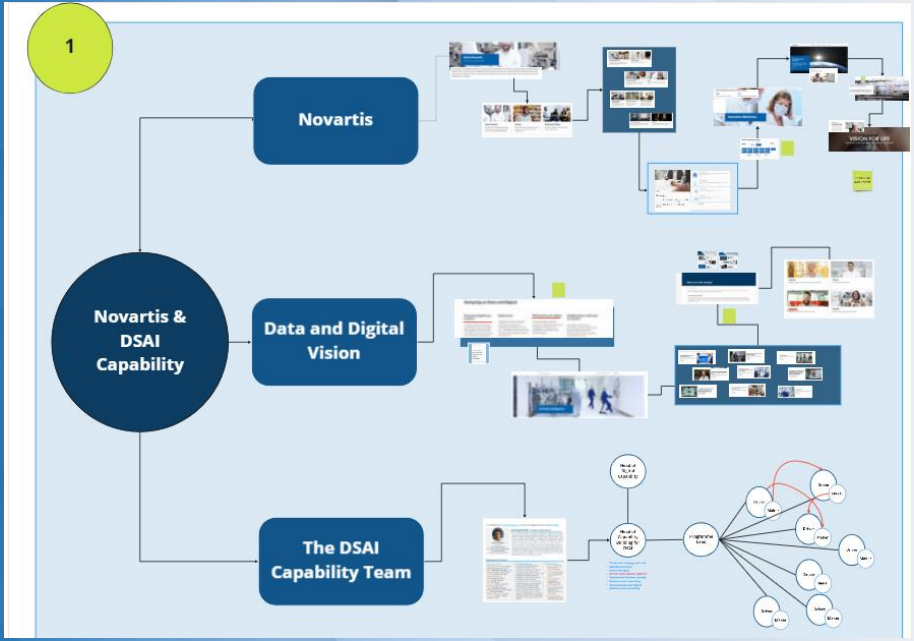
10 mins

6

The Future Focus
1. 5 Focus Areas
2. Community
3. User-centric

5 mins

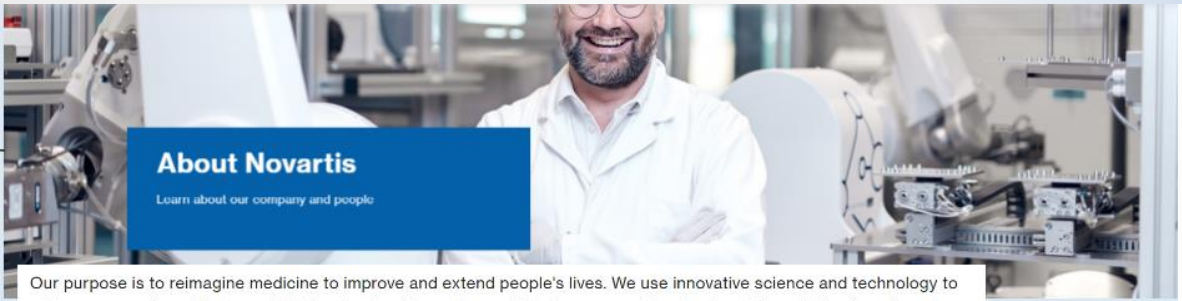
NOVARTIS | Reimagining Medicine



Novartis & DSAI Capability

Data Science & AI Academy

Novartis



Our purpose is to reimagine medicine to improve and extend people's lives. We use innovative science and technology to address some of society's most challenging healthcare issues. We discover and develop breakthrough treatments and find new ways to deliver them to as many people as possible. We also aim to reward those who invest their money, time and ideas in our company.

About Novartis

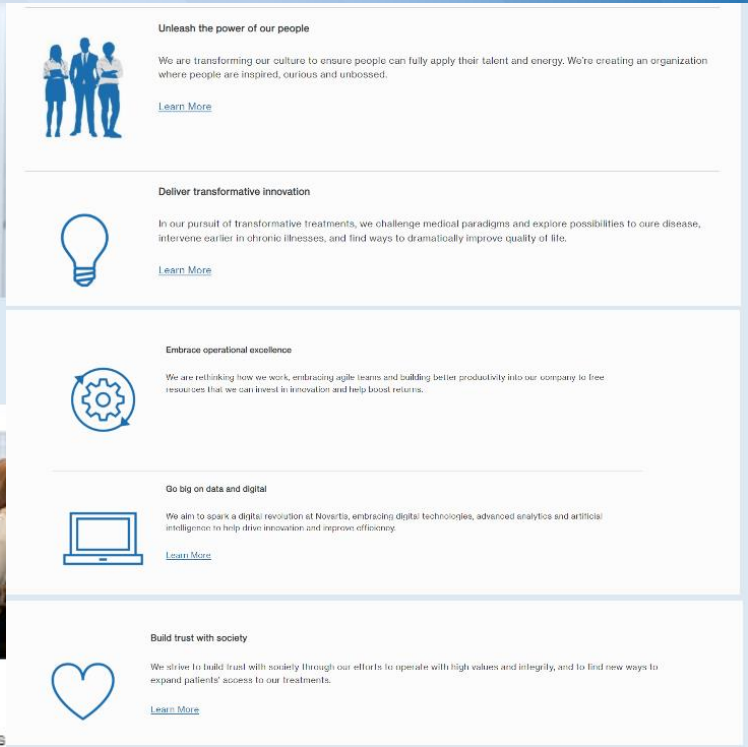
We discover and develop breakthrough treatments and find new ways to deliver them to as many people as possible.

Access

We are committed to bringing more of our medicines to more people, no matter where they are.

People and Culture

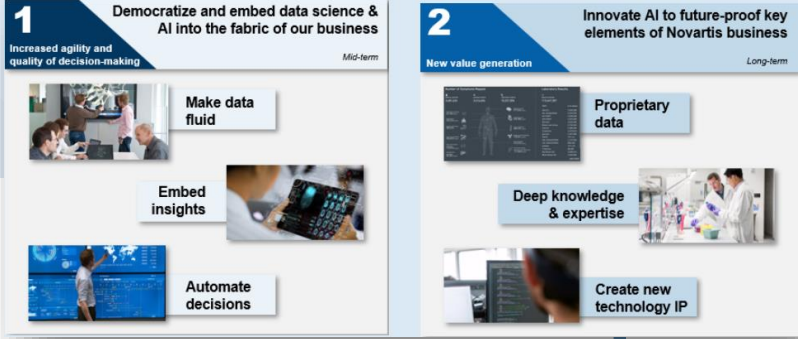
Novartis is building an Inspired, Curious and Unbossed culture.



NOVARTIS | Reimagining Medicine

Data Science & AI Academy

Data and Digital Strategy



Going big on Data and Digital

Enterprise lighthouse projects

12 Digital Lighthouse Projects embed data science and digital technologies across Novartis, from R&D to manufacturing and our commercial organizations.

Bold moves

Preparing for future disruptive healthcare scenarios and transforming standards of care, e.g. co-developed AI-powered app for heart failure patients in China with Tencent.

Making Novartis digital

Prioritizing digital learning, focusing on talent and investing in foundational platforms and capabilities are helping make Novartis digital.

Collaborations with tech ecosystem

From nimble startups and innovative academic institutions to big tech players, Novartis is collaborating with the ecosystem to accelerate at scale.

Novartis' data strategy is to ensure that all our data is "clean and linked". In other words: all data at Novartis is of good quality and interconnected so that we can build our own knowledge graph, and answer the questions that even Google doesn't know.

How will Novartis do this?

Novartis will do this by ensuring all information is Findable, Accessible, Interoperable and Reusable (FAIR) by allocating Universal Resource Identifiers (URIs) or unique identifiers to data elements. The two videos below will explain these concepts in more detail. In addition, the data strategy team have developed a **URI Builder** and **best practices** to help Data Professions -such as Data Stewards who define data across domains and Data Modelers and Data Engineers who design systems - to support the data strategy.

Data Science & AI Academy

The DSAI Capability Team

Head of Digital Capability

Head of Capability Building for DSAI

- Create the strategy and road-map
- Identify priorities
- Direct the team
- Deliver value against objectives
- Understand business context
- Network and connecting
- Communicate and inform
- Advisory and consulting

Programme Lead

Driver
Maker

Driver
Maker

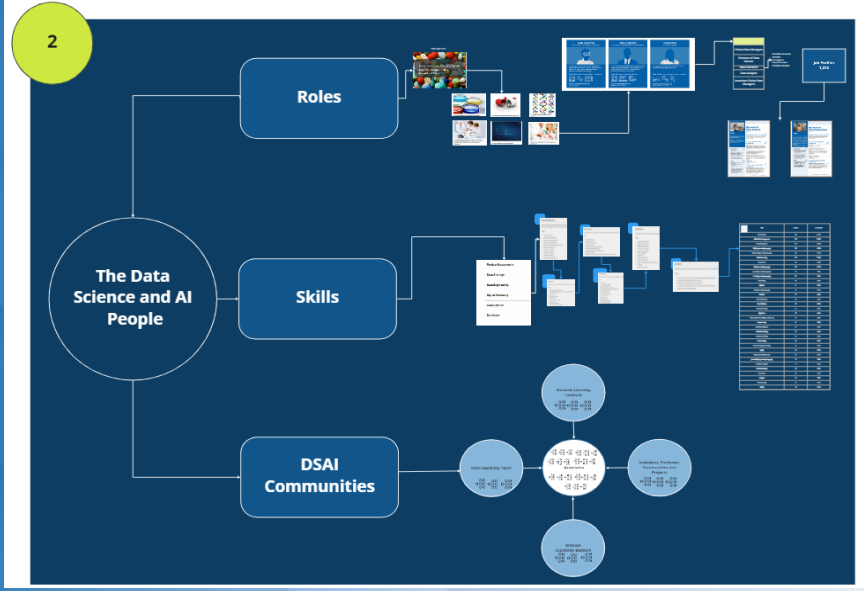
Driver
Maker

Driver
Maker

Driver
Maker

Driver
Maker

Dri
Maker



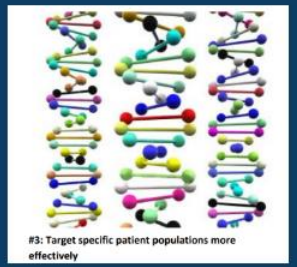
The Data Science and AI People

Roles

www.iqpc.com

#1: Accelerate drug discovery and development

#2: Optimize and improve the efficacy of clinical trials



#3: Target specific patient populations more effectively

#4: Better insight into patient behaviour to improve drug delivery and effectiveness and healthcare outcomes

#5: Improve safety and risk management

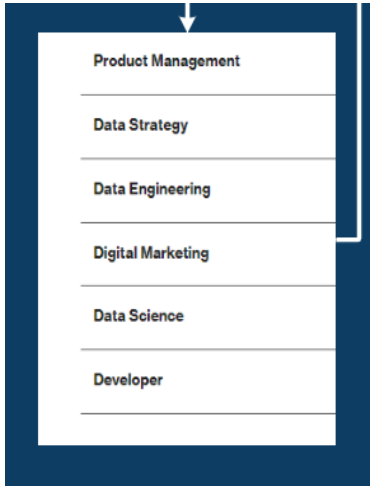
#6: Gain improved insight into marketing and sales performance

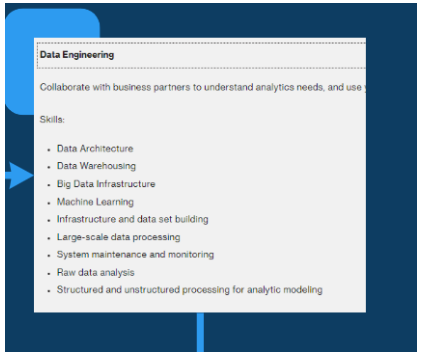
Job Profiles
1,275

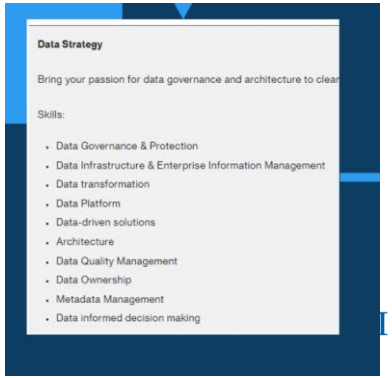
Data Science & AI Academy

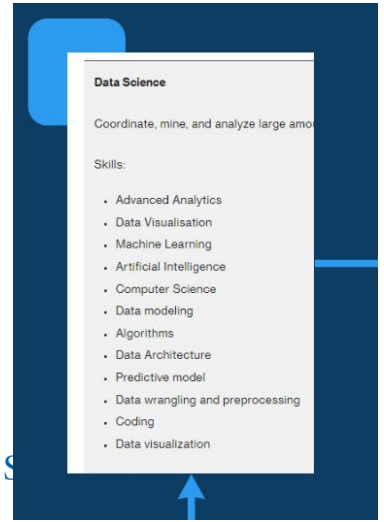
Skills

1275 Total profiles	Skills	Profiles	% of Profiles
	Data Analysis	298	23.37%
	Clinical Data Management	265	20.78%
	Data Management	246	19.29%
	SQL (Programming Language)	189	14.82%
	Python (Programming Language)	183	14.35%
	Machine Learning	173	13.57%
	Data Science	140	10.98%
	R (Programming Language)	129	10.12%
	Java (Programming Language)	97	7.61%
	C++ (Programming Language)	83	6.51%
	Data Mining	80	6.27%
	Big Data	71	5.57%
	C (Programming Language)	70	5.49%



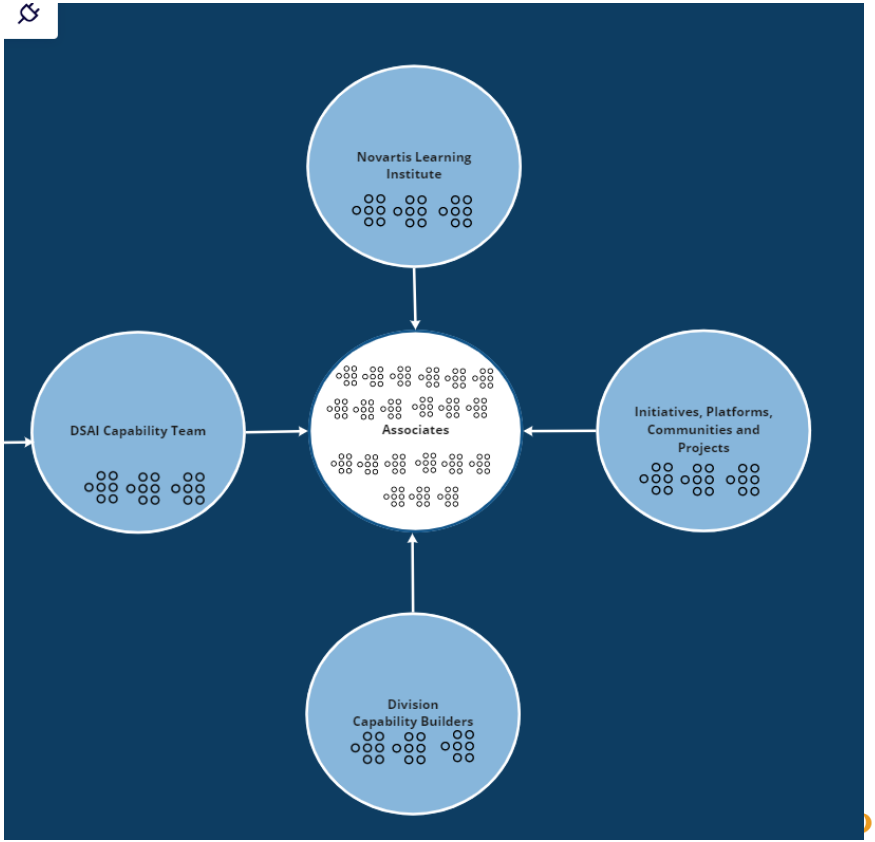


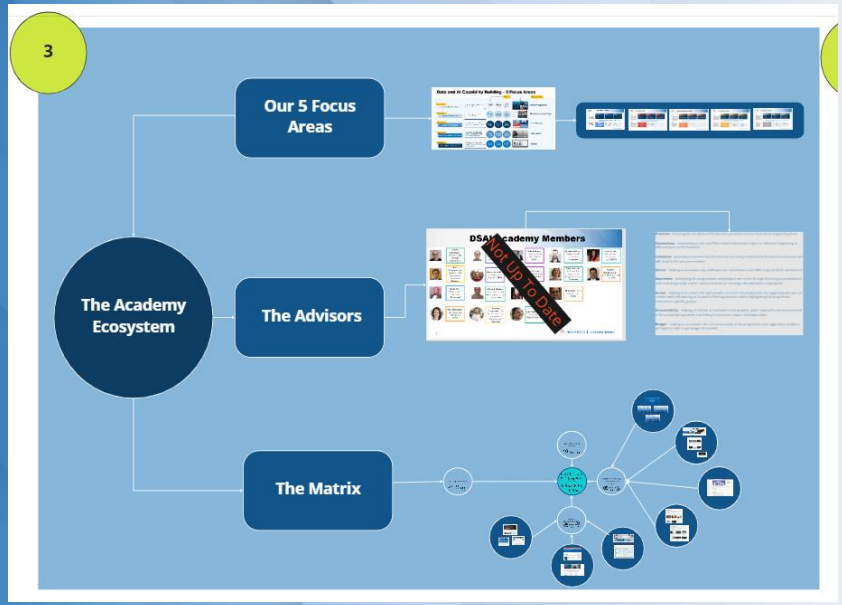




Data Science & AI Academy

DSAI Communities

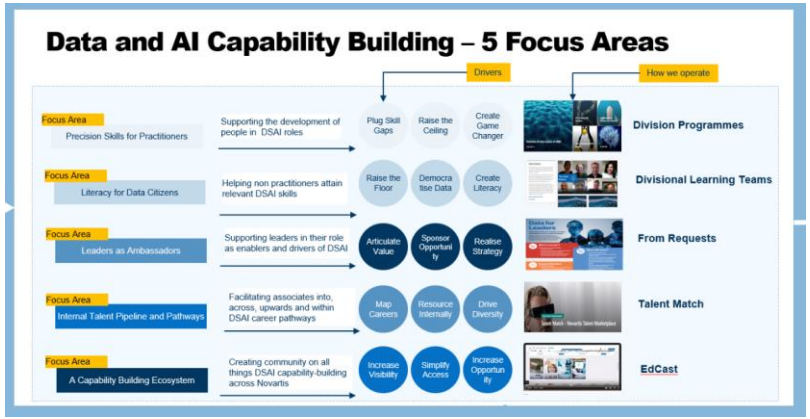


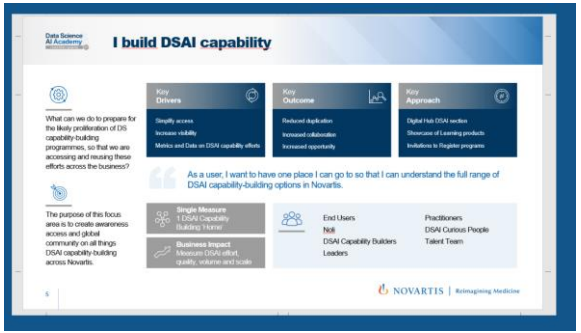


The Academy Ecosystem

Data Science AI Academy

Our 5 Focus Areas





NOVARTIS | Reimagining Medicine

Data Science & AI Academy

The Advisors

Priorities - ensuring we are aware of the business priorities and are focused on supporting these

Connections - networking us into any DSAI-related information, topics or initiatives happening in different parts of the business

Validation - providing assurance that the work we are doing is relevant to the business priorities and will result in the outcome needed

Advice – helping us to resolve any challenges our stakeholders and SMEs may not be in a position to

Awareness – promoting the programmes and products we create through featuring in promotional and marketing events and/or communications or meetings attended where appropriate

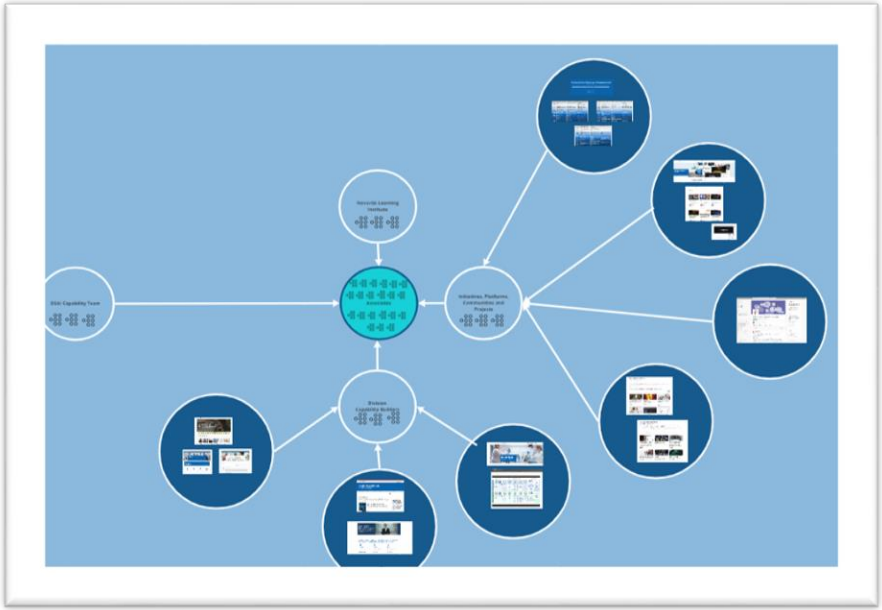
Access – helping us to ensure the right people can access the programme by suggesting who we can connect with, introducing us to parts of the organisation and/or highlighting the programme relevance to specific groups

Accountability – helping us to keep accountable to the purpose, goals, approach and measurement of the product/programme and linking it to business impact and imperatives

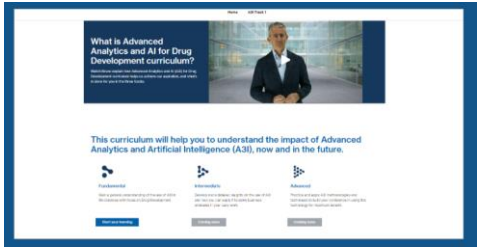
Budget – helping us to consider the cost versus value of the programme and suggestions of where we might be able to get budget (if needed)

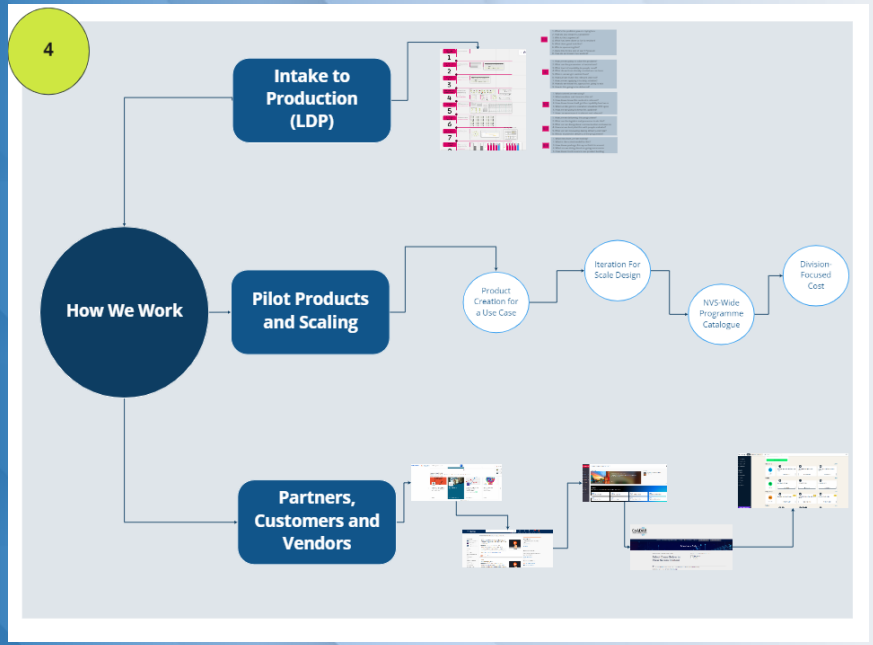
Data Science & AI Academy

The Matrix



Round 1	Slot 1 – 2:15 PM CET // 8:15 AM ET	Slot 2 - 2:35 PM CET // 8:35 AM ET	Slot 3 - 2:55 PM CET // 8:55 AM ET
Track 1 Business Application 1 Link to Recording	**Low Data, No problem! Deep Neural Networks are Still Useful** CTS Lead Author: Ananda Swarup Das	**Smart Predictive Activation & Readiness for Cosentyx** CTS Lead Author: Apurva Choudhary	**Titan.AI Price excellence: Bid price prediction with augmented intelligence.** SANDOZ Hector Benavides Pinpsovsky
Track 2 Business Application 2 Link to Recording	**Label Comparison automation with AI/ML** GDD Lead Author: Aoia Mohanty	**German Dossier Automation** PHARMA Lead Author: Natalia Klyueva	**Enhancing Cosentyx Therapy Onboarding of patients through explicable AI/ML modelling** CTS, PHARMA Lead Author: Ghal, Abee
Track 3 Business Application 3 Link to Recording	**Automated Anomaly Detection (AutoAD) for Financial Controls & Compliance (FC&C)** CTS Lead Author: Arun Prakash Asokan	**Using AI and ML techniques to perform Market Research Analysis** CTS Lead Author: Bijaylaxmi Sahoo	**Maximize the Medical Expert Engagement through Personalized Messaging** CTS, ONCOLOGY, PHARMA Lead Author: Sunil Kushwaha
Track 4 Science Application Link to Recording	**Federated and privacy preserving machine learning applied to structure-activity data** NIBR Lead Author: Noc Sturm	**Digital twins powered by machine learning for real time insights in Pharmaceutical R&D and Manufacturing** SANDOZ Lead Author: Rene Kaiblik	**Uncover new relationships between salesforce execution KPIs and performance using ML** PHARMA Lead Author: Zelina Hriskey
Track 5 Good Data Science Practice Link to Recording	**Using good data science practice and AI to establish Splicing as a new drugging modality** GDD, NIBR Lead Author: Christian Kofler	**Ten simple rules to kick off Good Data Science Practices in a Team: lessons from collaboration of Neuroscience (GDD) and Oxford Big Data Institute** GDD Lead Author: Jelena Calkina	**F1 in action - Learnings from a successful production deployment** SANDOZ Lead Author: Julen Rebollo Mugica
Track 6 Clinical Application Link to Recording	**Integration of Spatial Transcriptomics Gene Expression and H&E Pathology Data** NIBR PHARMA Lead Author: Angad Singh	**Predicting fast progressors from intermediate to late AMD Deep Image and Survival models for Optical Coherence Tomography** CTS, NIBR Lead Author: Imtiaz Hossain	**The eye as an objective measure of cognition** NIBR Lead Author: Jennifer Sorinas Norin
Track 7 Technological Advances in AI ML Link to Recording	**AI-based personalized omnichannel orchestration for Cosentyx in Switzerland** CTS, PHARMA Lead Author: Aryan Singh	**Knowledge Graph NGE Driving Personalization in commercial & sales** CTS PHARMA Lead Author: Deepanshu Mehta	**Deep learning of molecular properties for formulation design using quantum descriptors** GDD Lead Author: Olivia Woolley
Track 8 AI For Life Residents Link to Recording	**A Comparison of Algorithms for Feature Selection** CTS, NIBR Lead Author: Elizabeth Becker	**Discovering immuno-oncology drug targets using advanced graph embeddings** NIBR Lead Author: Hao Chen	Impact evaluation of new commercial strategies ONCOLOGY, PHARMA Lead Author: Martin Buchacek

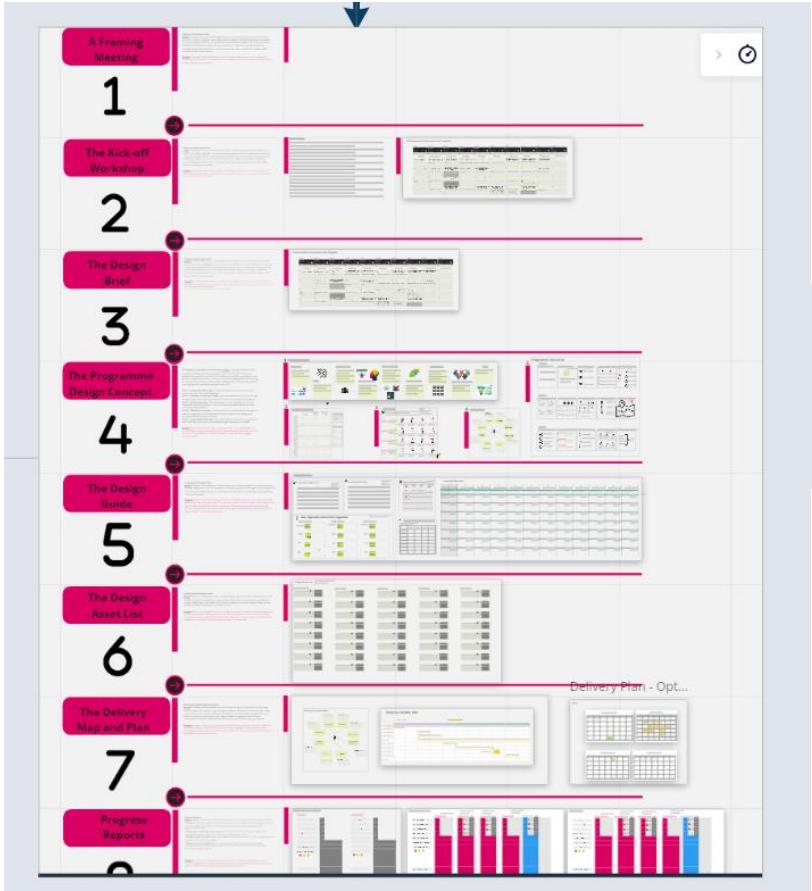



4
Intake to Production (LDP)
How We Work
Pilot Products and Scaling
Product Creation for a Use Case
Iteration For Scale Design
NVS-Wide Programme Catalogue
Division-Focused Cost
Partners, Customers and Vendors

How We Work

Data Science AI Academy

Intake to Production



1-3

1. What's the problem you are trying to solve?
2. How do you know it's a problem?
3. Who is this targeted at?
4. What has been done so far to resolve this?
5. What does good look like?
6. Who is sponsoring this?
7. Does this fit into one of our 5 Focus areas?
8. How do we know it has worked?

4

1. How are we going to solve this problem?
2. What are the parameters of restrictions?
3. What level of capability do people need?
4. What do we have already created we can leverage?
5. Where can we get content from?
6. How can we make this relevant and real?
7. How are we applying it to daily activities?
8. How do we know this approach is going to work?
9. How is this going to be delivered?

5-6

1. What content are we using?
2. What medium and format is this in?
3. How do we know this content is relevant?
4. How do we know it will get the capability level we need?
5. What can be generic and what should be NVS-special?
6. How are we going to keep this updated?
7. How can we ensure it is vibrant and relevant?

6-7

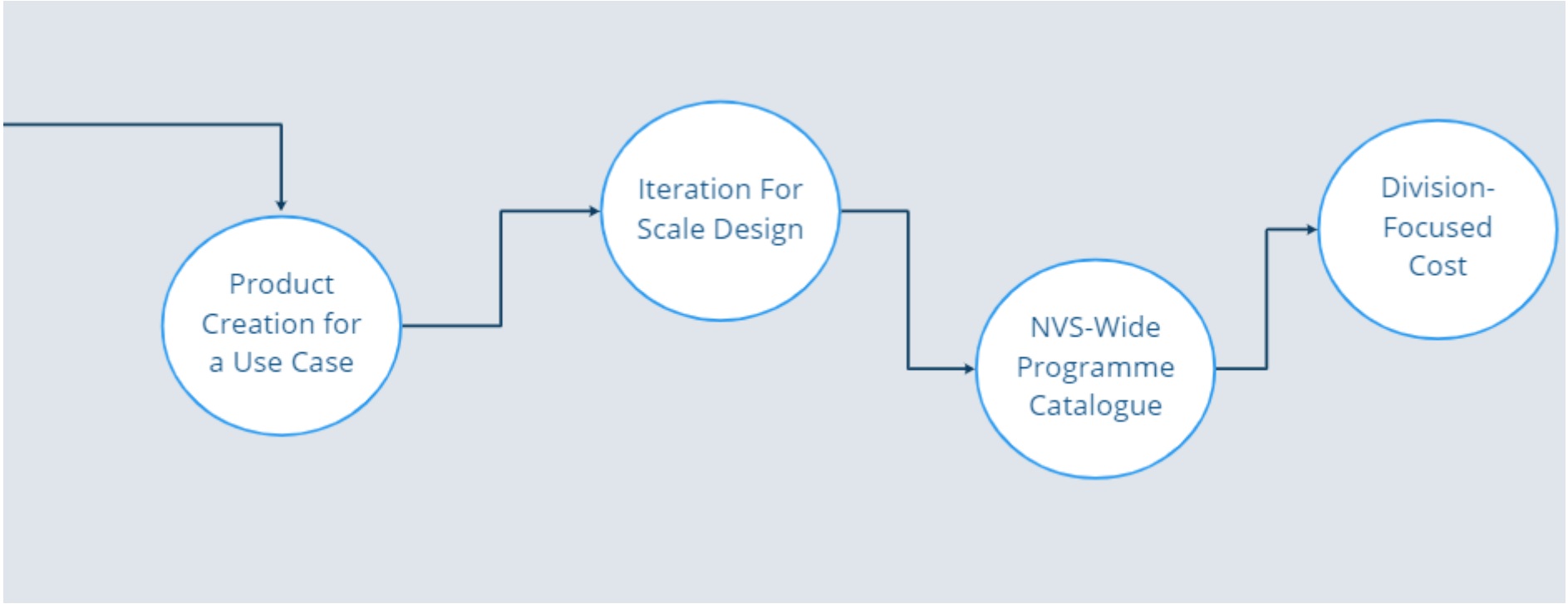
1. How are we delivering this programme?
2. What are the logistics and processes to do this?
3. What are we doing about communication and awareness?
4. How can we best pilot this with people and who?
5. What are we measuring during delivery and how?
6. Who is involved in delivery of the programme?

8-9

1. What iterations are we making?
2. What is the scaled model for this?
3. How do we package this up so that it is accessible?
4. What are we doing about on-going measurement?
5. How do we track issues in our product backlog?

Data Science AI Academy

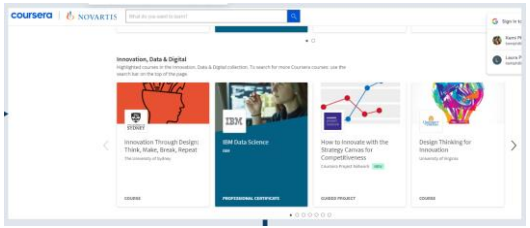
Pilot Products and Scaling

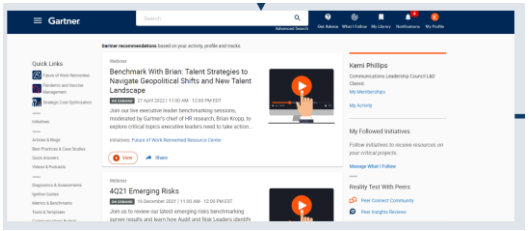


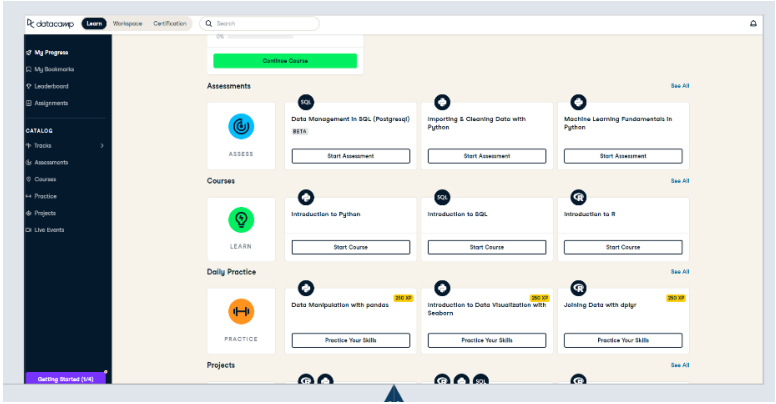
NOVARTIS | Reimagining Medicine

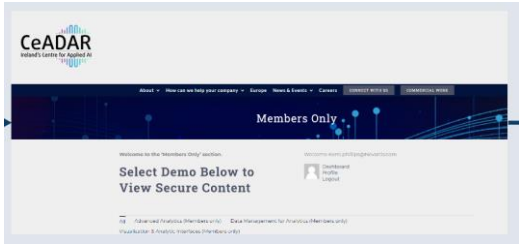
Data Science & AI Academy

Partners, Customers and Vendors

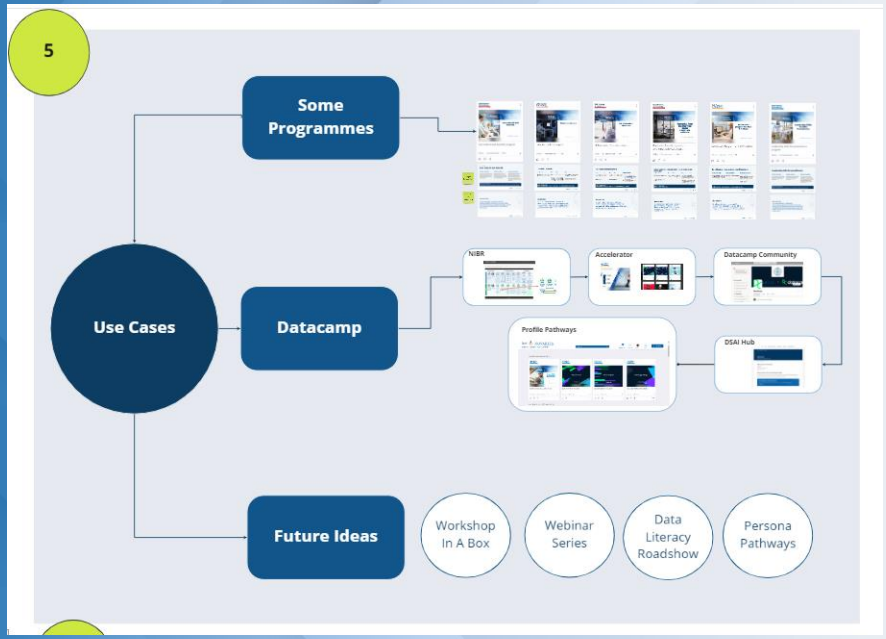








NOVARTIS | Reimagining Medicine


5
Some Programmes
Use Cases
Datacamp
NIBR
Accelerator
Datacamp Community
Profile Pathways
DSAI Hub
Future Ideas
Workshop In A Box
Webinar Series
Data Literacy Roadshow
Persona Pathways

Use Cases

Data Science & AI Academy

Some Programmes

Low code AI and Auto ML

Problem statement

How can we increase the number of associates that are able to build DSAI solutions without having to invest significant time and effort in learning coding language?

Problem evidence

Significant appetite for non DSAI individuals accessing low or no-code tools and training opportunities within Productivity Improvement, Automation, Dev Ops and Data Literacy.

Program description

The programme's overall aim is to support the upskilling of data citizens of Novartis by leveraging low code AI and auto ML tools

Alteryx, Dataiku, Tellius, Microsoft are the tools accessible to Novartis associates.

Single Success Measure
An increase in the number of people that are able to create AI solutions that are not Data Scientists.

1

Data Science AI Academy | NOVARTIS

Data for Leaders

Problem statement

How can we make our leaders more effective customers of Data Science?

Problem evidence

Unclear on how to use data to drive strategic decisions and insights to solve complex problems; how to ask the business-relevant question and the process of solving data problems; how to effectively communicate in the language of data engineers and data scientists.

Program description

Data for Leaders is a training program to provide leaders with a working knowledge of the key concepts of data science and help them to better leverage data in the organization

Single Success Measure
Business stakeholders are increasing their use of DSAI Solutions to make business decisions.

1

Data Science AI Academy | NOVARTIS

Leadership skills for practitioners

Problem statement

How can we improve the storytelling, communication and business context knowledge & capability of DSAI Practitioners?

Problem evidence

Misalignment, miscommunication and lack of effectiveness between Data Science teams and business stakeholders

Program description

This program is for all the DSAI practitioners as they tend to get too technical with non-practitioners while articulating the value of their work and this is causing difficulty for non-practitioners in understanding the value of their work

Single Success Measure
Business stakeholders are increasing their use of AI Solutions to make business decisions.

1

Data Science AI Academy | NOVARTIS

Accelerator program for New Frontiers

Problem statement

How can we support DSAI enthusiasts in building DSAI skills so that we have a robust, quality pipeline of associates that can move into DSAI roles?

Problem evidence

Associates do not know how to bridge the gap between their skills set and the capability level required for them to move into a DSAI Practitioner role.

Program description

The aim of this program is to provide a learning journey for DSAI enthusiasts of New Frontiers community so they can develop DS skills and progress into DS roles. Learners will be working on use cases / projects / assignments to apply the skills.

Single Success Measure
Number of DSAI roles filled by associates who have been through the program.

1

Data Science AI Academy | NOVARTIS

Enterprise Data Management (EDM) awareness pathways

Problem statement

How can we create awareness around the need for harmonization and consistency of Data across the organization that inspires data citizens to follow a good data management practice?

Problem evidence

The Maturity Assessment score that Novartis has is lower than benchmark and Data Literacy is critical in helping to positively impact that score.

Program description

This program is targeted at all associates in Novartis with the intention of increasing literacy around Data Management. Aim is to ensure that Novartis associates understand that data literacy and management is not just the responsibility of people that sit in Data roles. This is an 'Awareness' only level program.

Single Success Measure
Increase in Data Maturity Index score.

1

Data Science AI Academy | NOVARTIS

UK Innovative Medicine

Problem statement

How can we develop the capability of the Marketing team in their ability to understand and utilize the full offering of data science teams to drive and measure their IDAPs?

Problem evidence

The budget marketing teams spend on DS projects is high, despite asking DS teams for the same data each year.

There is no evidence they use or track data towards their goals.

Program description

This program is for both Brand and Data Science teams. The main purpose of the program is to -

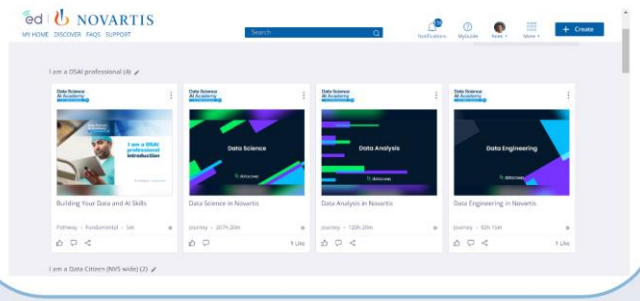
- Use numbers to derive the actions & tactical plans, to be evaluated at regular intervals and improve these plans accordingly
- Have increased understanding of business and how DSAI Teams can help achieve Strategy and business excellence
- Be able to evaluate end to end value cycle and who is responsible at what level

Single Success Measure
Reduced budget, reduced tactical plans and increase in quality of strategic decisions.

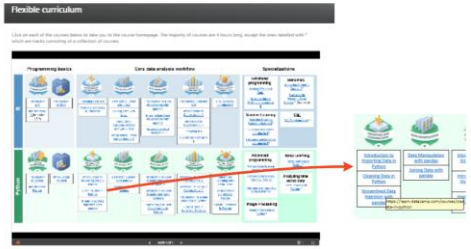
1

Data Science AI Academy | NOVARTIS

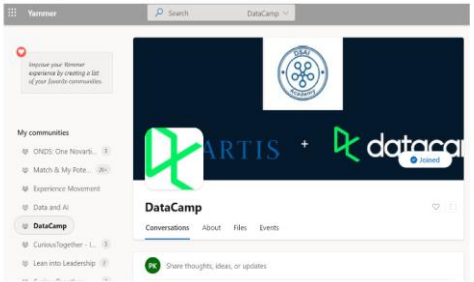
Profile Pathways



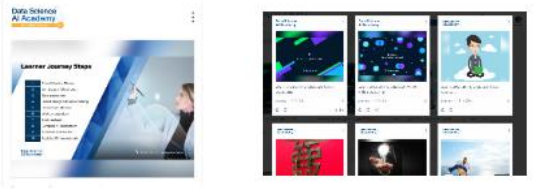
NIBR



Datacamp Community

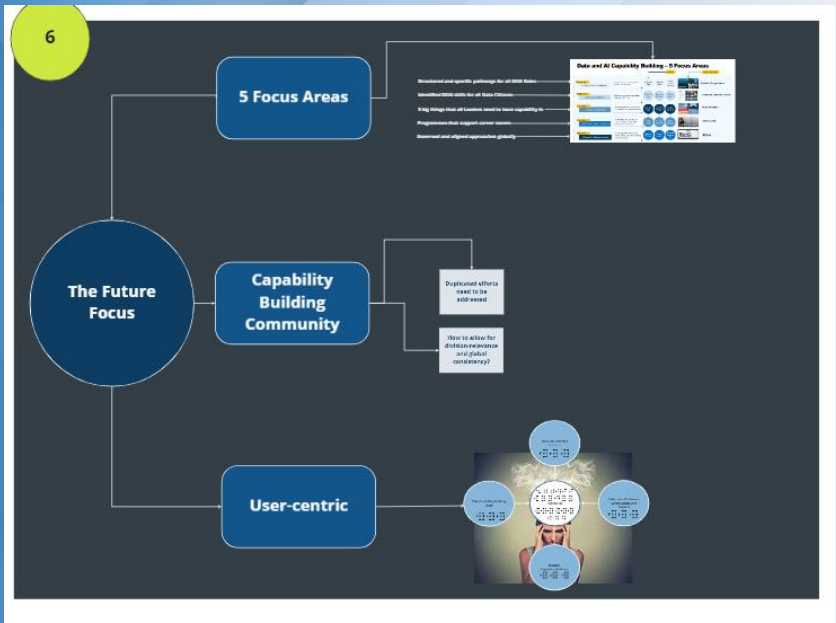


Accelerator



edicine

Future Ideas



Future Plans

Data Science & AI Academy

5 Focus Areas

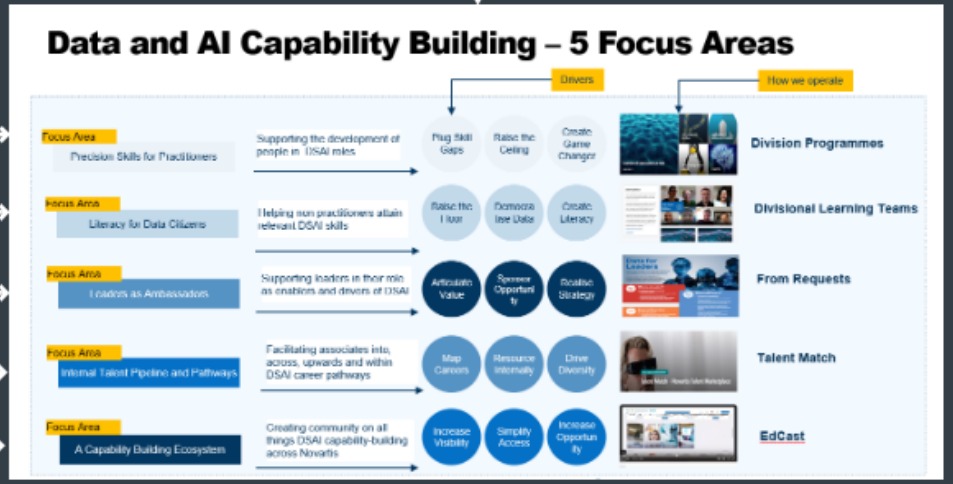
Structured and specific pathways for all DSAI Roles

Identified DSAI skills for all Data Citizens

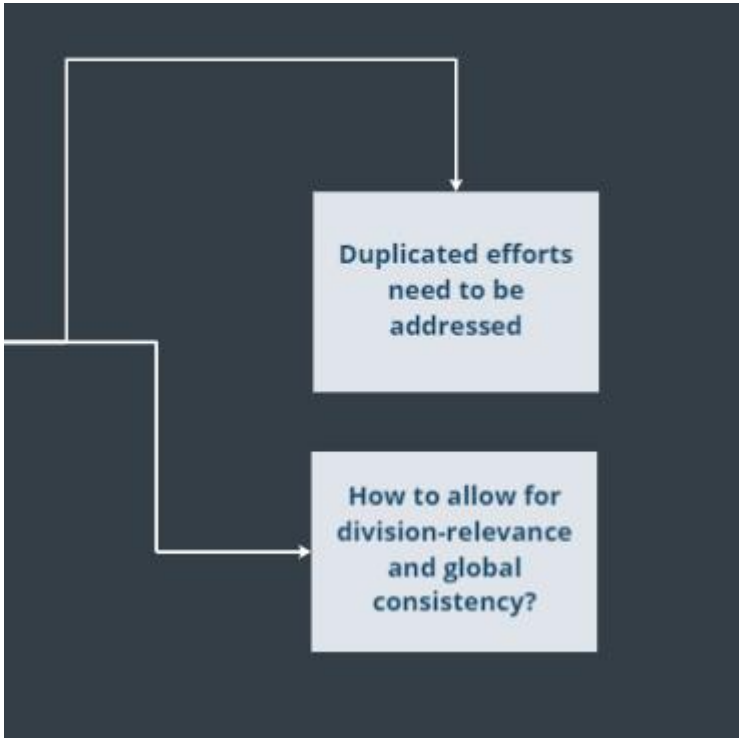
3 big things that all Leaders need to have capability in

Programmes that support career moves

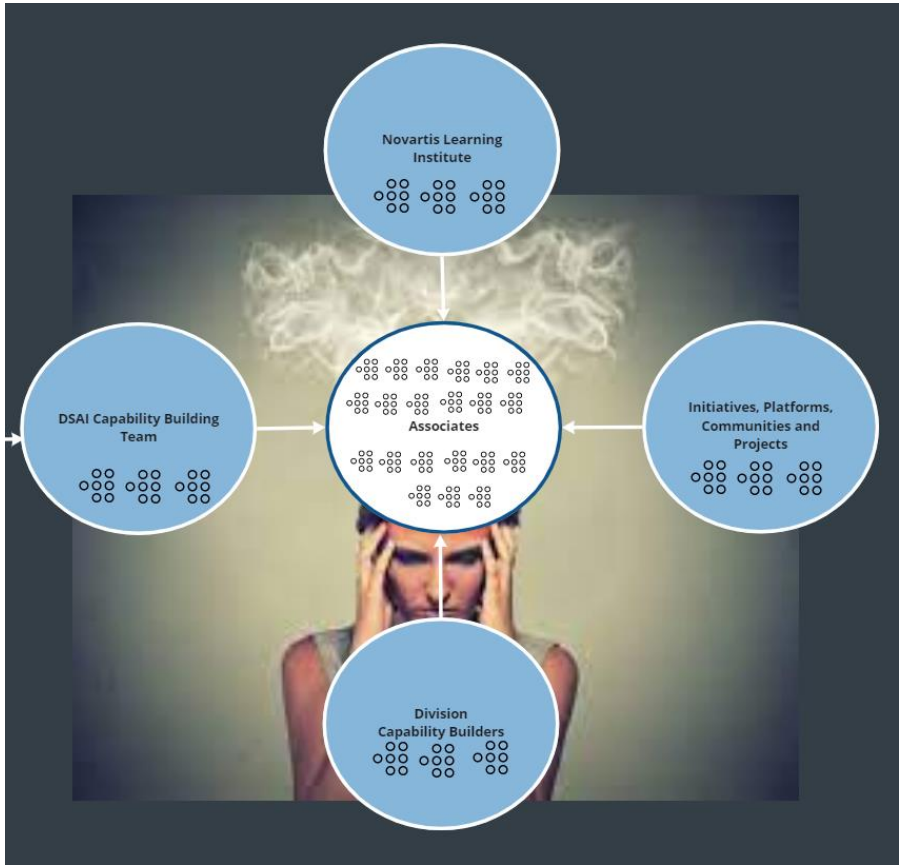
Governed and aligned approaches globally



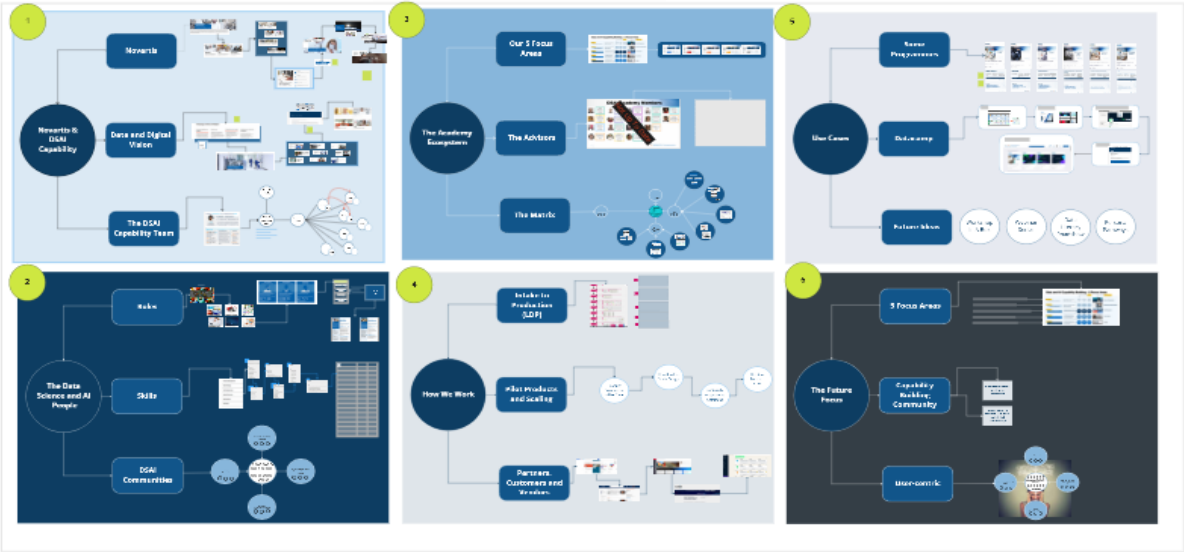
Capability Building Community



User-Centric



1		5 mins
2		5 mins
3		5 mins
4		5 mins
5		10 mins
6		5 mins



Thank you

Data Science & AI Academy

NOVARTIS | Reimagining Medicine