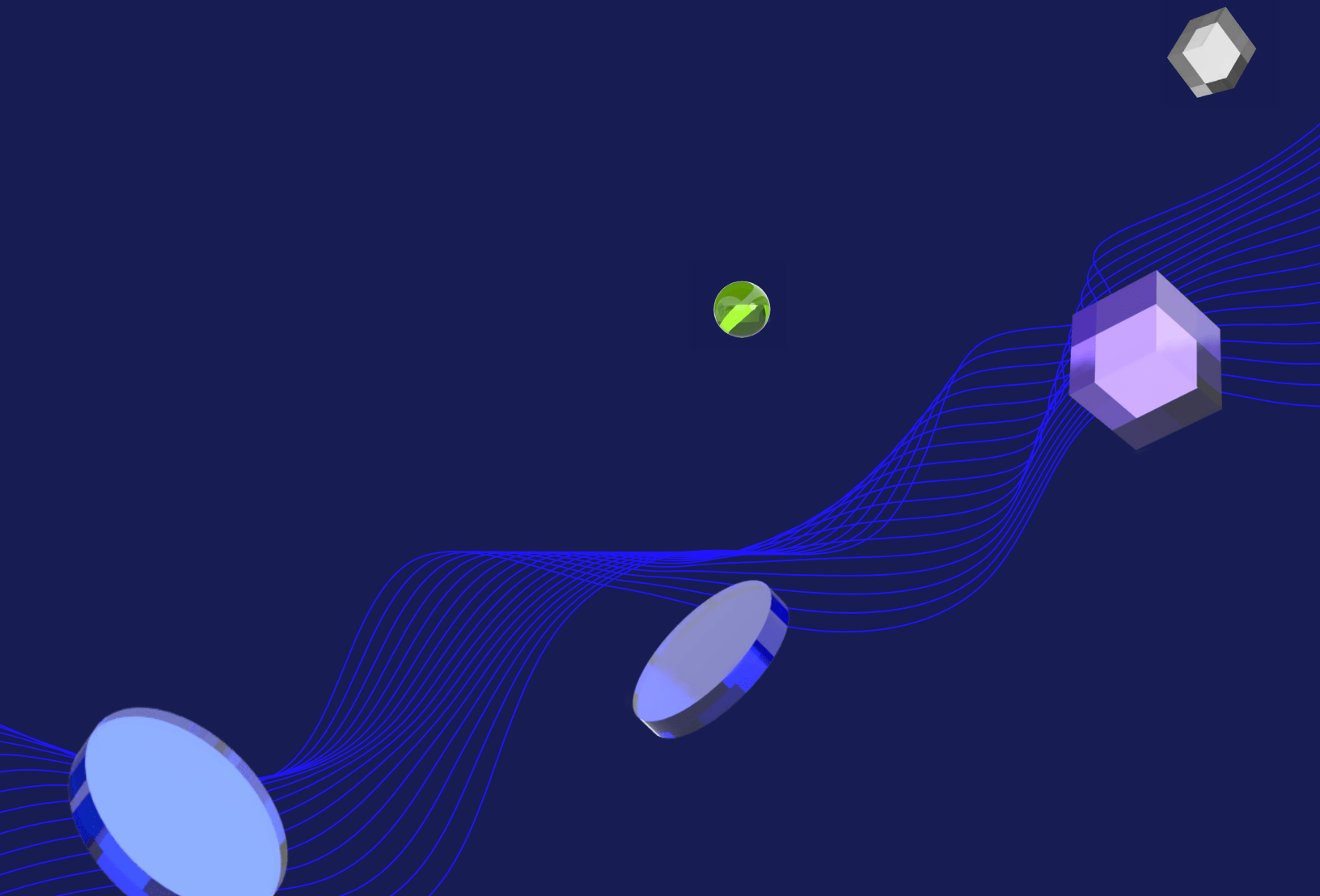U UDACITY

SCHOOL OF BUSINESS

Data Product Manager

Nanodegree Program Syllabus

Overview

Leverage market data to amplify product development. Learn how to apply data science techniques, data engineering processes, and market experimentation tests to deliver customized product experiences. Begin by leveraging the power of SQL and Tableau to inform product strategy. Then, develop data pipelines and warehousing strategies that prepare data collected from a product for robust analysis. Finally, learn techniques for evaluating the data from live products, including how to design and execute various A/B and multivariate tests to shape the next iteration of a product.

💡 Learning Objectives

A graduate of this program will be able to:

- Visualize data with Tableau for statistical analysis and identify unique relationships between variables via hypothesis testing and modeling.

- Evaluate the output captured in statistical analyses and translate them into insights to inform product decisions.

- Understand which data is best collected through quantitative versus qualitative methods, and how to interpret it.

- Utilize user data to create user personas that can be transalted into code and build user journey maps that describe the stages a user engages with the product.

- Extract insights from user journey maps to define KPIs of suggested product enhancements.

Program information

⌛ Estimated Time

3 months at 10hrs/week*

⚊ Skill Level

Intermediate

Prerequisites

A well-prepared learner has:

• Basic understanding of data terminology (i.e. big data, database, algorithms, etc.)

• Some experience with data analysis (basic SQL and Tableau), and a general understanding of product management is helpful.

Required Hardware/Software

Learners need access to:

• SQL, Tableau, Google Slides or Microsfot PowerPoint, Google Sheets or Microsoft Excel.

• A 64-bit computer with a minimum operating system of Windows 8.1 or later, Apple MacOS 10.10 Yosemite or later, or any Linux OS that supports the browsers mentioned above.

• Any Chrome OS that supports the browsers mentioned above.

*The length of this program is an estimation of total hours the average student may take to complete all required coursework, including lecture and project time. If you spend about 5-10 hours per week working through the program, you should finish within the time provided. Actual hours may vary.

Applying Data Science to Product Management

As products become more digital, the amount of data collected is increasing. Product managers now have the opportunity to utilize this data to not only enhance existing products, but create completely new ones. Understand the role of data product managers within organizations and how they utilize data science, machine learning, and artificial intelligence to solve problems. Learn how to visualize data with Tableau for statistical analysis and identify unique relationships between variables via hypothesis testing and modeling. Evaluate the output captured in statistical analyses and translate them into insights to inform product decisions.

Course Project

Develop a Data-Backed Product Proposal

A key responsibility of data product managers is analyzing market data to propose new product opportunities. In this project, learners will apply the skills acquired in this course to create the MVP launch strategy for the first flying car taxi service, Flyber, in one of the most congested cities in America—New York City. Learners will acquire taxi data for a comparable initial analysis. The dataset contains real taxi drop-offs and pick-ups in New York City. First, learners will analyze the existing use cases for and identify temporal, behavioral, and spatial trends of ground-based taxis from the dataset. Next, they will deep-dive into user research data to understand the general sentiment, desire, concerns, and use cases of a flying cab service to prospective customers. Finally, they will synthesize their insights to create a data-backed product proposal that recommends what features the first flying taxi service should have to maximize consumer delight, adoption, and profits.

Lesson 1

Introduction to Data Product Management

- Explain the concept and history of data product management.

- Distinguish the different types of data product managers.

- Identify the various internal stakeholders that data product managers work with.

- Understand the fundamentals of general product management from talking to customers, analyzing data, designing high-level solutions, prioritizing work, setting a roadmap, facilitating development, organizing launch communications, and producing product iterations.

Lesson 2

Granularity, Distribution & Modeling Data

- Analyze what is being measured in a dataset.

- Explain the benefits of aggregates or roll-up tables.

- Compare and contrast the differences between fact and dimensional tables.

- Calculate and analyze the distribution of a dataset.

Lesson 3

Trends, Enrichment & Visualization

- Identify and differentiate visualizations and justify when to apply the right visualization for the appropriate analyses (spatial, temporal, distribution, correlation)—box plot, line chart, donut chart, density map, or histogram.

- Implement enriching datasets and utilize common online repositories for publicly available datasets for analysis.

Lesson 4

Midterm: Develop a Data-Backed Product Proposal (Part 1)

- Utilize SQL and other data analysis techniques to explore and enrich a dataset to identify customer pain points, trends, and opportunities.

Setting Product Objectives & Strategy

- Interpret data and insights to come up with product objectives.
- Design KPIs that measure if your products are meeting their objectives.
- Utilize best practices and different techniques for setting up explicit feedback mechanisms.
- Create experiments that generate meaningful results in a timely, resourceful manner.
- Drive instrumentation strategies for proper event data collection.

Lesson 5

Proposal Synthesis & Design

- Assemble and arrange your narrative based on stakeholders.
- Weave data visualizations and insights into presentations in a consumable format.
- Develop the key points to hit in a product proposal presentation.

Course 2

Establishing Data Infrastructure

Products that collect data from its users can only leverage such data if it gets processed and stored properly. Data product managers need to ensure their products have the appropriate supporting data pipelines in place so that data collected from users can be extracted, transformed, and loaded into a data lake or warehouse that can be used for statistical analysis. Learn about data infrastructure components including data pipelines, data producers, data consumers, data storage, and data processing. Master the nuances of evaluating strategic decisions for data pipeline technology, including security and compliance. Apply learnings to make step-by-step decisions for data infrastructure of an organization. Create solutions for real-world data infrastructure problems and evaluate tradeoffs.

Course Project

Build a Scalable Data Strategy

Once a product has been launched into the market, the amount of data collected typically dramatically increases and requires the appropriate infrastructure to support such growth. In this project, learners will continue acting as a data product manager for Flyber, a flying-taxi service that has been massively successful in New York City after its first product launch, and create a data strategy to not only handle the massive amount of incoming data, but also process it to get the business insights needed to grow the business. First, learners will define the data needs of primary business stakeholders within the organization and create a data model to ensure the data collected supports those needs. Then, they will perform the necessary extraction and transformation of the data to make the data relevant to answer business questions. Lastly, learners will interpret data visualizations to understand the scale of Flyber's data growth and choose an appropriate data warehouse to enable that growth.

Lesson 1

Introduction to Data Pipelines

- Understand the importance and need of data pipelines.
- Understand the various components of data pipelines.
- Learn how to organize data pipeline components to automate end-to-end data flow.
- Create conceptual data pipelines.
- Learn about the influence of Saas and IoT on the data infrastructure world.
- Understand classic data problems that can be addressed by data pipelines.

Lesson 2

Data Consumers

- Learn about primary data consumers and their data needs.
- Identify data consumers in an organization and relevant data use cases based on their business goals.
- Understand the components in building a relational data model.
- Apply relational data models to business scenarios.

Lesson 3

Data Producers

- Learn how to create event data models and implement them to get business insights.

- Understand primary product management KPIs (active users, session length, bounce rate, conversion rate, and click-through rate).

- Use data collected from event models to calculate product KPIs.

- Identify primary data producers in an organization.

- Distinguish between backend data producers (SaaS, ERPs, and data stores).

- Differentiate between types of data (structured vs. semistructured vs. unstructured).

Lesson 4

Data Strategy

- Understand the difference between ETL and ELT processes.

- Distinguish between batch processing and stream processing.

- Select the appropriate data processing components for the product based on data needs.

- Distinguish between a data warehouse and data lake.

- Differentiate between SQL and NoSQL databases.

- Determine the appropriate data storage components for a particular data infrastructure of a product based on data needs.

- Assess capabilities of various data warehousing options (build vs. buy, cloud vs. on-prem, open source vs. proprietary, and insource vs. outsource) to make strategic decisions for data infrastructure.

- Understand data security and compliance (PII, PCI, HIPAA, GDPR, and CCPA) components related to product use cases.

Leveraging Data in Iterative Product Design

The best products adapt to market changes over time and are constantly being refined based on user feedback. With a robust data pipeline, the amount of data collected through product usage is extremely valuable to product managers for enhancing their products. Understand which data is best collected through quantitative versus qualitative methods, and how to interpret it. Learn how to apply chi-square tests to determine if results from data analysis are statistically significant. Utilize user data to create user personas that are actionable for development teams to translate into code and for building out user journey maps that describe the stages a user engages with the product along with the associated risks and opportunities. Extract insights from user journey maps to define KPIs of suggested product enhancements and design the relative hypotheses and experiments that are needed to prove the assumptions of product enhancements.

Course Project

Create an Iterative Design Path

As products exist in the market over time, opportunities for product design improvements arise. In this project, learners will continue in the role as a data product manager for Flyber, a flying-taxi service that has grown its user base exponentially, and define customer segments and relevant new product feature opportunities. First, learners will evaluate data from a conducted A/B test to identify key behavioral and descriptive attributes of users to define user personas and map out the significant stages of the user journey within the Flyber app. Then, they'll create an assumption map to explain the testable risks, opportunities, and correlated KPIs for product design improvements of the app experience, including the most impactful page and most significant subset of users. Lastly, learners will use the completed assumption map as well as the developed user persona and journey to construct hypotheses for new product features of the Flyber app and experiments to validate these hypotheses.

Lesson 1

Choose & Measure KPIs

- Describe how data collection and usages changes depending on the state of the software (from pre-launch to product with existing customer base).
- Choose common KPIs for different business models (freemium, SAAS, eCommerce).
- Calculate the most popular KPIs for user acquisition, activation, retention, and revenue.
- Suggest additional data that should be collected to allow for KPI tracking.

Lesson 2

Evaluate User Acquisition & Usage Funnels

- Identify the steps in a typical user acquisition and activation funnel.
- Run analyses in Tableau to determine rate of user dropoff during each step of a funnel.
- Visualize a funnel analysis in Tableau in bar chart form.

Lesson 3

Cohort Analysis

- Explain the importance of segmenting user data by cohorts.
- Identify behavioral traits in a data set that could be used to analyze cohort behavior.
- Apply cohort analysis to segment funnel analysis.
- Calculate feature use within a product, both among all users and among selected cohorts using existing event data.

Lesson 4

Qualitative & Quantitative Data

- Explain the benefits and drawbacks of quantitative data.
- Explain the benefits and drawbacks of qualitative data.
- Determine when qualitative data is most useful during the iterative design process.
- Describe unstructured and structured methods of qualitative research, including interviews/focus groups, surveys, and prototype testing.
- Explain the framework of "jobs to be done" as used during qualitative research.
- Narrow scope and choose which feature(s) to test first using the RICE framework.

Lesson 5

A/B Test & Multivariate Test

- Explain the benefits and drawbacks of A/B testing.

- Explain the benefits and drawbacks of multivariate testing.

- Determine what type of test is appropriate given feature(s) of interest.

- Determine what user actions should be tracked during A/B and multivariate tests.

- Explain methods to create unbiased control and test groups of users.

- Apply the correct statistical methods to explain the difference between the experimental and control group data and make a decision.

Meet your instructors.

JJ Miclat

Senior Product Manager at Zendesk

JJ is a product leader obsessed with creating simple, novel solutions for the world's most challenging issues. He's sunk his teeth into analytics and data product management for Beats Music, Apple, VSCO, and Collective Health.

Vaishali Agarwal

Product Manager at Expedia

Vaishali has 12+ years' experience in tech ecosystem ranging from product management, product development, content writing, to coding. She is experienced in building platforms, high performance startup divisions, streamlined operations, and managing customer expectations.
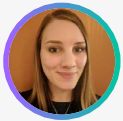
Anne Rynearson

Senior Product Manager at Disqo

Anne has 6+ years' experience in product management in the software industry, including EdTech and market research industries. She is an agile leader experienced in launching and growing both consumer and enterprise-facing products. Proven ability to lead cross-functional teams in iterative data-driven product development with a focus on strategic product growth.

Udacity's learning experience
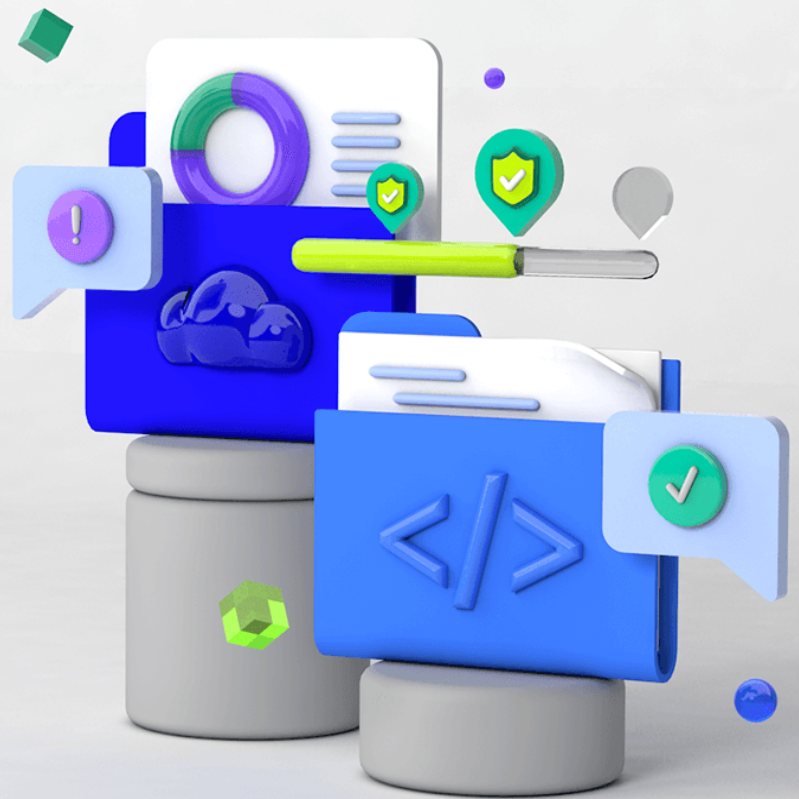
Hands-on Projects

Open-ended, experiential projects are designed to reflect actual workplace challenges. They aren't just multiple choice questions or step-by-step guides, but instead require critical thinking.

Knowledge

Find answers to your questions with Knowledge, our proprietary wiki. Search questions asked by other students, connect with technical mentors, and discover how to solve the challenges that you encounter.

Workspaces

See your code in action. Check the output and quality of your code by running it on interactive workspaces that are integrated into the platform.

Quizzes

Auto-graded quizzes strengthen comprehension. Learners can return to lessons at any time during the course to refresh concepts.
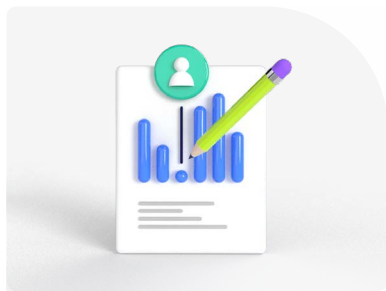
Custom Study Plans

Create a personalized study plan that fits your individual needs. Utilize this plan to keep track of movement toward your overall goal.

Progress Tracker

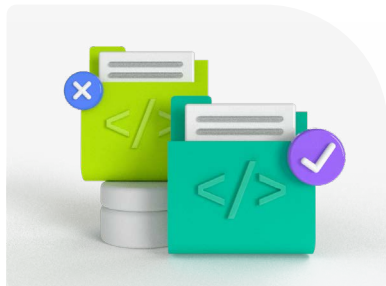Take advantage of milestone reminders to stay on schedule and complete your program.

Our proven approach for building job-ready digital skills.

Pre-Assessments

Identify skills gaps.

- In-depth assessments benchmark your team's current level of knowledge in key areas.
- Results are used to generate custom learning paths.

### Experienced Project Reviewers

Verify skills mastery.

- Personalized project feedback and critique includes line-by-line code review from skilled practitioners with an average turnaround time of 1.1 hours.
- Project review cycle creates a feedback loop with multiple opportunities for improvement—until the concept is mastered.
- Project reviewers leverage industry best practices and provide pro tips.

Technical Mentor Support

24/7 support unblocks learning.

- Learning accelerates as skilled mentors identify areas of achievement and potential for growth.
- Unlimited access to mentors means help arrives when it's needed most.
- 2 hr or less average question response time assures that skills development stays on track.
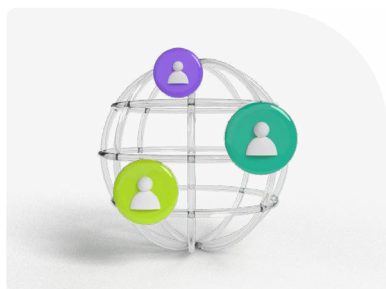
Mentor Network

Highly vetted for effectiveness.

- Mentors must complete a 5-step hiring process to join Udacity's selective network.
- After passing an objective and situational assessment, mentors must demonstrate communication and behavioral fit for a mentorship role.
- Mentors work across more than 30 different industries and often complete a Nanodegree program themselves.

Dashboard & Reporting

Track course progress.

- Udacity's enterprise management console simplifies management of bulk enrollments and employee onboarding.
- Interactive views help achieve targeted results to increase retention and productivity.
- Maximize ROI while optimizing job readiness.

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