



APM Data Literacy Skills Framework – abridged

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Because when projects succeed, society benefits

Contents

Foreword	3
Introduction	4
Skill 1: Managing project information	6
Skill 2: Foundations of data	8
Skill 3: Interpreting and influencing with data	10
Skill 4: Data visualisation and storytelling	12
Skill 5: Decision-making with data	14

Foreword

APM Data and AI Working Group

The APM Data and AI Working Group is a collaborative forum dedicated to advancing the use of data analytics and artificial intelligence (AI) within the project profession. Its mission is to raise awareness, improve data literacy and promote the use of data-driven decision-making and AI to enhance project outcomes. The group brings together experts from industry, academia and public bodies to inform standards, sponsor research and help the profession adopt data and AI more widely in project delivery.

In 2021, APM commissioned Warwick University to research the barriers and enablers of project data analytics (PDA) in infrastructure delivery. Drawing on insights from senior industry experts, the report *(R)evolution: Barriers and Enablers of Project Data Analytics in Infrastructure Projects* identified critical themes such as data literacy, data quality and the scale of organisational change required for successful PDA adoption. With the potential to unlock over £23bn in annual savings, this report provides a vital roadmap for project professionals seeking to harness data and AI to transform project outcomes across the UK infrastructure sector.

The APM Data and AI Working Group has used this report as a roadmap to develop guidance for the profession and to help overcome these barriers to adoption, specifically:

1. Improving data literacy

A key finding is that widespread data literacy is essential for PDA adoption. Participants emphasised that project professionals need a foundational understanding of data concepts and how analytics can support decision-making. This includes demystifying technical jargon and clarifying the capabilities and limitations of tools like dashboards and predictive models. Without this baseline literacy, organisations risk misusing tools or failing to recognise their value, leading to poor implementation outcomes.

2. Enhancing data quality

Data quality emerged as the most universally important enabler. Poor data, characterised by inconsistent formats, missing fields and lack of standardisation, undermines both descriptive and predictive analytics. Participants noted that while perfect data quality is unrealistic, organisations must establish basic standards (e.g. naming conventions) and accountability mechanisms. A virtuous cycle can be created: better analytics highlight data issues, which then drive improvements in data quality, further enhancing analytics outcomes.

3. Addressing the scale of change required

Adopting PDA is not a simple software upgrade; it requires a fundamental transformation across culture, systems and skills. The report stresses the need for a tailored, holistic change-management strategy that reflects an organisation's maturity in PDA-related areas. This includes recognising the scale of the task, securing leadership buy-in and potentially leveraging consultants – while ensuring internal capability is developed.

Together, these findings underscore that adopting data analytics (and AI) is a complex, organisation-wide journey requiring strategic planning, cultural change and sustained investment in people and processes.

This is one of three papers developed by the working group and is aimed at addressing barrier 1: Improving data literacy. We hope you find this of value in your journey to wider adoption of data analytics and AI in the delivery of your projects.

John McGlynn – Chair of APM Data and AI Working Group

The *APM Data Literacy Skills Framework – abridged* was conceived by Gareth Parkes and developed by the APM Data and AI Working Group.

Introduction

The *APM Data Literacy Skills Framework – abridged* will help you assess and improve performance and develop your organisational capability when working with data. It can help managers and leaders improve their teams and help individuals to identify and address training and development needs.

What is the *APM Data Literacy Skills Framework*?

The *APM Data Literacy Skills Framework – abridged* outlines five key skills required for effective data management, analysis and utilisation. It reflects current practice and the future needs of the profession, providing a benchmark for all project professionals working with data. Each skill includes a number of indicators to help you assess your skill levels and plan for the future.

Relationship with *APM Competence Framework*

The *APM Competence Framework* outlines the 29 competences required for professional project management. The *APM Data Literacy Skills Framework – abridged* outlines the complementary skills that can be applied across many of these competences. The two frameworks use a similar format and rating system so that you can assess across both frameworks to gain deeper insights into your team.

This is an abridged version of the framework; a more comprehensive and detailed framework is available exclusively to APM Corporate Partners.

How do I use the *APM Data Literacy Skills Framework*?

The *APM Data Literacy Skills Framework – abridged* is a tool to assess and improve performance using a simple three-step process:

Step 1: Review the framework

Review the five skills using the titles and introductions as a guide. You may also want to consider which skills are appropriate in your current role, the nature of the data initiatives you manage and the maturity of the organisations you work for.

Step 2: Rate yourself against each skill

Using the indicators within each skill, rate yourself using the six-point rating scale from ‘unaware’ to ‘expert’.

Level		
0	Unaware	Has no awareness, knowledge or experience of the skill.
1	Aware	Has knowledge but no experience of the skill.
2	Practised	Has knowledge of the skill and can apply it under supervision.
3	Competent	Has a comprehensive knowledge of the skill and has applied it.
4	Proficient	Can critically evaluate and adapt the skill and apply it independently.
5	Expert	Can critically evaluate and develop new theories or methods and can apply them in complex situations.

Step 3: Identify gaps and development needs

Using the indicators, identify strengths, weaknesses and any learning and development needs. Explore ways of addressing your weaknesses and developing your strengths through mentoring, coaching, shadowing, formal training or qualifications. Repeat these steps periodically to monitor progress and stay on track.

Skill 1: Managing project information

The ability to organise, store, retrieve and utilise information throughout the entire project life cycle.

Encompasses a range of skills designed to ensure project information is accurate, accessible and contributes to successful project outcomes.

Level	Indicators
Aware	<ul style="list-style-type: none"> • Understands that projects generate information used for decision-making. • Can organise and search for digital files and data using a basic taxonomy. • Stores files using a naming convention on local folders and can share files requested. • Overwrites old documents with new versions. • Is aware of shared systems for naming files and shared locations for storing them.
Practised	<ul style="list-style-type: none"> • Recognises the importance of organised and accessible project information for decision-making and progress reporting. • Uses a consistent filing system and taxonomy to organise project documents. • Understands protocols associated with shared documentation, such as document naming conventions. • Can routinely locate and access commonly used documents. • Understands fundamental concepts like information management and data analysis.
Competent	<ul style="list-style-type: none"> • Can mitigate information management risks including data loss and proactively ensure data security and integrity. • Understands the organisational decision-making and information governance. Uses statistical techniques such as mean, median and standard deviation to sort and analyse data. • Understands how to secure data. • Uses tools to store, retrieve and share information with team members, and can maintain accurate project documentation.

<p>Proficient</p>	<ul style="list-style-type: none"> • Understands best practices for managing project information throughout its life cycle, writes procedures and adapts practices to accommodate different projects and evolving technologies. • Familiar with statistical modelling and forecasting, reviews IT systems and policies to secure data and understands the notion of a data analytics strategy. • Leverages project management tools and methodologies to ensure information accessibility facilitates collaboration across organisational boundaries. • Understands the value of information as a project asset and coaches others on project information management. • Adapts information management practices to accommodate growing organisational maturity and evolving technologies.
<p>Expert</p>	<ul style="list-style-type: none"> • Understands the notion of a comprehensive information management strategy for complex projects. • Is comfortable with information management approaches that range from explicit and tacit knowledge to fuzzy logic. • Understands how to manage effectively in the event of a critical loss of project information or the absence of critical systems. • Champions the use of data and information to drive informed decision-making using advanced project management tools and methodologies. • Leverages organisational information management capability for commercial advantage and articulates project futures from the perspective of information and knowledge.

Skill 2: Foundations of data

The ability to develop a strong foundation in core data concepts, empowering individuals to navigate the world of data with confidence.

Provides the necessary tools to understand data and terminology and interpret information effectively.

Level	Indicators
Aware	<ul style="list-style-type: none"> • Understands that data may be accurate, inaccurate or incorrect. • Understands basic data visualisations such as pie charts or line graphs. • Differentiates between different data types (numerical, categorical, text, etc.). • Articulates and distinguishes between basic data concepts, such as data and information. • Updates shared databases and practises basic data security.
Practised	<ul style="list-style-type: none"> • Uses common data collection methods like surveys and experiments. • Identifies obvious data quality issues and performs basic data cleaning techniques. • Interprets simple data visualisations and understands data integrity and ethics. • Understands the difference between qualitative and quantitative data and explicit and tacit knowledge. • Has proficiency with spreadsheets, databases and prompting AI.
Competent	<ul style="list-style-type: none"> • Grasps core data concepts, enabling confident navigation in the world of data. • Demonstrates knowledge of various data collection methods and their strengths and weaknesses. • Understands the data integrity and ethics and data privacy regulations. • Evaluates data analytics or AI to comply with data protection laws, ethics and user interests. • Differentiates between data types and understands the significance of FAIR (findable, accessible, interoperable, reusable) data.

<p>Proficient</p>	<ul style="list-style-type: none"> • Masters core and complex data concepts and applies this to a range of data challenges. • Understands the implications and sources of data risk within projects and manages the full generative AI life cycle. • Articulates insights from data using advanced data analysis terminology and makes data accessible. • Champions data quality, employs advanced cleaning techniques and conducts regular data quality assessments. • Consults key stakeholders before implementing significant data or AI applications ensuring data privacy, inclusivity and equity.
<p>Expert</p>	<ul style="list-style-type: none"> • Understands comprehensive information management strategies for explicit and tacit knowledge, and fuzzy logic in complex projects. • Champions data-driven decision-making using advanced project management tools and methods. • A trusted source of advice on data and AI, understands the psychology and ethics of data. • Designs data standards for interoperability and reusability, pioneers innovative analysis and AI techniques, and advocates for responsible data use within organisations. • Collaborates across industries to define new data standards, designs long-term data strategies and champions data inclusivity and automation with human oversight.

Skill 3: Interpreting and influencing with data

The ability to extract meaning and derive insight from data that leads to action.

Involves a meticulous examination of data and the skills to relate it to the organisational context in order to generate and broker knowledge and insight.

Level	Indicators
Aware	<ul style="list-style-type: none"> • Knows where to find essential project reports. • Analyses and explains basic data. • Understands which documents are needed at each project stage. • Recognises simple patterns and trends within data sets. • Familiar with basic project data analytics terminology and regularly asks questions about the meaning and significance of different data.
Practised	<ul style="list-style-type: none"> • Shows aptitude for common data analysis skills. • Uses data trends, patterns and insights to explain past events or performance. • Recognises the potential for a narrative within the data and is able to formulate storylines. • Can distinguish between useful and poor reports. • Understands the principles behind descriptive, diagnostic, predictive, prescriptive and cognitive analytics.
Competent	<ul style="list-style-type: none"> • Recognises the importance of context, such as source collection methods, and data interpretation. • Critically assesses data context to understand potential biases and limitations within the organisation. • Identifies the most effective knowledge brokers within the project. • Uses basic statistical analysis techniques and data visualisation tools to explore data and draw conclusions. • Considers data sharing a strategic requirement and coaches decision-makers on the benefits and pitfalls of AI.

<p>Proficient</p>	<ul style="list-style-type: none"> • Leverages advanced statistical analysis and data mining techniques to extract maximum value from data sets. • Demonstrates an expert eye for identifying potential data inconsistencies and errors. • Crafts compelling narratives that weave data, context and insights into a clear and impactful story. • Uses statistical models and machine learning algorithms to analyse past data and make predictions about future events. • Uses data analysis to suggest specific actions to achieve desired results or mitigate risks.
<p>Expert</p>	<ul style="list-style-type: none"> • Regarded as an expert on the future strategic direction of the organisation. • Applies advanced data visualisation techniques to communicate complex data stories effectively. • Comfortable working in data-rich and data-scarce environments. • Translates insights from data analysis into future strategic directions for the organisation. • Provides expert thought leadership on the future of the project delivery profession.

Skill 4: Data visualisation and storytelling

The ability to leverage data visualisation tools that transform complex data sets into clear and impactful narratives that drive informed decision-making.

Combines the power of data analysis, visualisation and communication to create impactful stories that resonate with audiences.

Level	Indicators
Aware	<ul style="list-style-type: none"> • Aware of powerful project stories within the organisation. • Familiar with basic data visualisation tools. • Knows which reports are considered essential. • Able to interpret basic charts and graphs. • Presents raw data or basic visualisations with little supporting context or narrative.
Practised	<ul style="list-style-type: none"> • Grasps the basic principles of data storytelling and presents stories using simple data visualisations. • Understands the concept of generative AI and can convey general messages using common chart types (bar charts, line charts, etc.). • Comfortable with tailoring messages for different audiences and uses reports and slides to present data. • Accepts and learns from feedback to adapt techniques to suit user needs. • Can use reports and slides to present data.
Competent	<ul style="list-style-type: none"> • Possesses a strong understanding of core data visualisation principles and creates compelling data stories based on a solid foundation in data analysis, visualisation and communication. • Has a range of established techniques for visualising common data sets and can identify and interpret key trends or insights. • Understands the value of designing impact, filtering and drilling down into data for further exploration and building simple charts and graphs. • Comfortable with storytelling as a reporting technique and coaches decision-makers on how data should be visualised to match user needs. • Familiar with the principles of effective communication and can tailor stories for different audiences based on their data literacy.

<p>Proficient</p>	<ul style="list-style-type: none"> • Understands the responsibility of the storyteller and the contextual and cultural sensitivity of different stories. • Possesses an exceptional ability to leverage visualisation to create impactful data stories, adapting them to the target audience and the context of the presentation. • Uses a full range of media, including audio, video and generative AI, to tell stories and is comfortable with both good- and bad-news data stories. • Captures audience attention with compelling narratives that connect data to real-world situations and the decision-making process. • Tracks the impact of data stories and storytelling as a tool for continuous improvement and organisational change.
<p>Expert</p>	<ul style="list-style-type: none"> • Has an extensive collection of stories and examples of great visualisation. • Knows how to articulate the value of stories and visualisation. • Understands the process of translating stories and visualisation into action. • Masters the use of AI for storytelling and visualisation. • Able to adapt visualisations and stories spontaneously in response to questions.

Skill 5: Decision-making with data

The ability to integrate data analytics and AI into the decision-making process.

Involves optioneering decisions, using data to simulate alternative outcomes and to adapt decision-making according to levels of impact and uncertainty.

Level	Indicators
Aware	<ul style="list-style-type: none"> • Understands the key decision points in a project. • Is comfortable with the role of the decision-maker. • Builds arguments informed by basic data. • Articulates the rationale for decisions. • Communicates decisions to those involved or affected.
Practised	<ul style="list-style-type: none"> • Recognises the most appropriate time to make decisions. • Understands the importance of emotion as well as data in making and communicating decisions. • Understands the impact of difficult decisions and how to mitigate this. • Articulates the reason why making a decision is premature due to a lack of data. • Reflects on a decision, plans how to approach it better next time and coaches others on the data they need to make a decision.
Competent	<ul style="list-style-type: none"> • Understands an organisation's risk appetite and attitude. • Is comfortable with varying levels of data quality and data confidence. • Understands the basis on which different data needs to be validated. • Draws together data and insight from multiple sources to inform decisions. • Uses comparative sources of data to explore different outcomes.

Proficient	<ul style="list-style-type: none"> • Understands the basis of human or AI-enabled data analysis. • Comfortable with weighting options to select a particular course. • Recognises the role of personal heuristics in making evidence-based decisions. • Champions evidence-based decision-making and challenges poor decisions made on insufficient data. • Changes direction where necessary in a timely and confident manner.
Expert	<ul style="list-style-type: none"> • Comfortable advocating for approaches or strategies without current data, relying on values or emotional intelligence. • Clearly articulates the level of confidence or uncertainty in decisions based on data sources. • Recognised as a master of group decision-making. • Communicates assumptions and heuristics that inform decisions. • Trusted decision-maker, especially when there is no clear responsibility; weighs impact, data availability and risk when making decisions.



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