

# Institute of Analytics

## Analyst Competency Framework

The Future is Here.



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## The IoA Analyst Competency Framework

### Foreword

Dr. Clare Walsh FloA  
Head of Education

The Institute of Analytics is a membership body to promote professional standards in data science and analytics worldwide. At the IoA, we recognise that data analytics is a complex and broad field of study, but anyone with perseverance and commitment can learn to work to professional standards with data.

We have researched our Analyst Competency Framework to ensure that our vision for our members is aligned to industry standards in engineering and business fields. It creates a clear pathway through the field of analytics, with multiple entry points depending on educational levels.

Our training provision for members is fully aligned to this framework and will allow all stakeholders to have a better understanding of what they can expect of members at different levels of training, and the support needed.

The four training themes place different emphasis on four broad skill areas. There is a necessary emphasis on developing the coding, data manipulation and analysis skills in our Knowledge and Analytics section. These are the skills that set our members apart from other professionals, and we want to make sure our members to have a balance of depth of knowledge and breadth of experience in data manipulation. They might not get these skills from work experience alone. Data analytics is also an interdisciplinary field. As more decisions are delegated to machines, we want to ensure that our members know what it means to operate in an ethical and professional way through Governance and Professionalism training. We want our members to make their work explainable through Communications training. Finally, because of the role data leaders are likely to play in the future, we also structure training to prepare them to lead complex projects through Leadership and Personal Effectiveness.

We are committed to supporting quality, ethical data analytics and the professional work of our members.

For more information, please contact: [hello@ioaglobal.org](mailto:hello@ioaglobal.org)

## About the Framework

Our framework is divided into four sections, with each representing a fundamental skill at that level.

### 1) Knowledge & Analytics

What sets our members apart from other professionals is, of course, their ability to manipulate data. The largest part of the framework covers data skills, software and coding. We have up to 7 years of training materials, with a recommended 35 hours per year, and over 200 hours of guided, interactive learning available to those who want to go into more depth of study. We have two tracks through the coding content, and members can specialise in R or Python, or they can train in both languages to increase their employability prospects. Coding training is available in an installation free environment, meaning the only equipment needed to access the materials is a good WiFi connection. By the time members complete their training period with us, they will have experienced running complex AI analysis with deep learning algorithms on both structured and unstructured data sets. We review our content continually in line with developments in the field and feel confident our members will be able to bring value to the teams they work for.

### 2) Governance & Professionalism

Analysts need to demonstrate integrity in their data collection processes, data labelling and analysis work. They need to be able to advise on model interpretation and recommendations, and in particular, be clear about areas of contention and the limitations of their work. For this reason, we have our Governance and Professionalism training offering. We work globally, and defining an ethical data science practice that integrates an understanding of probability distributions and complex technical processes with pre-negotiated local and global value frameworks is not easy. It something we engage our members with from the moment they join us. Our Governance and Professionalism content sets out the expectations of trustworthy and responsible innovation.

### 3) Communication

We want to encourage participatory technology, where all stakeholders can understand how decisions have been reached. Historically, the field of analytics has been held back by poor communication skills. Making data analytics explainable to target audiences with unknown data literacy is an essential part of the work of a data analyst. Decisions are being delegated more and more to machines, and so translating complex technical terminology and technical processes into ideas that everyone can understand is an essential and challenging skill our members need to master. Our communications training offers a range of preparation, from avoiding visual deception to making machine learning techniques comprehensible to all.

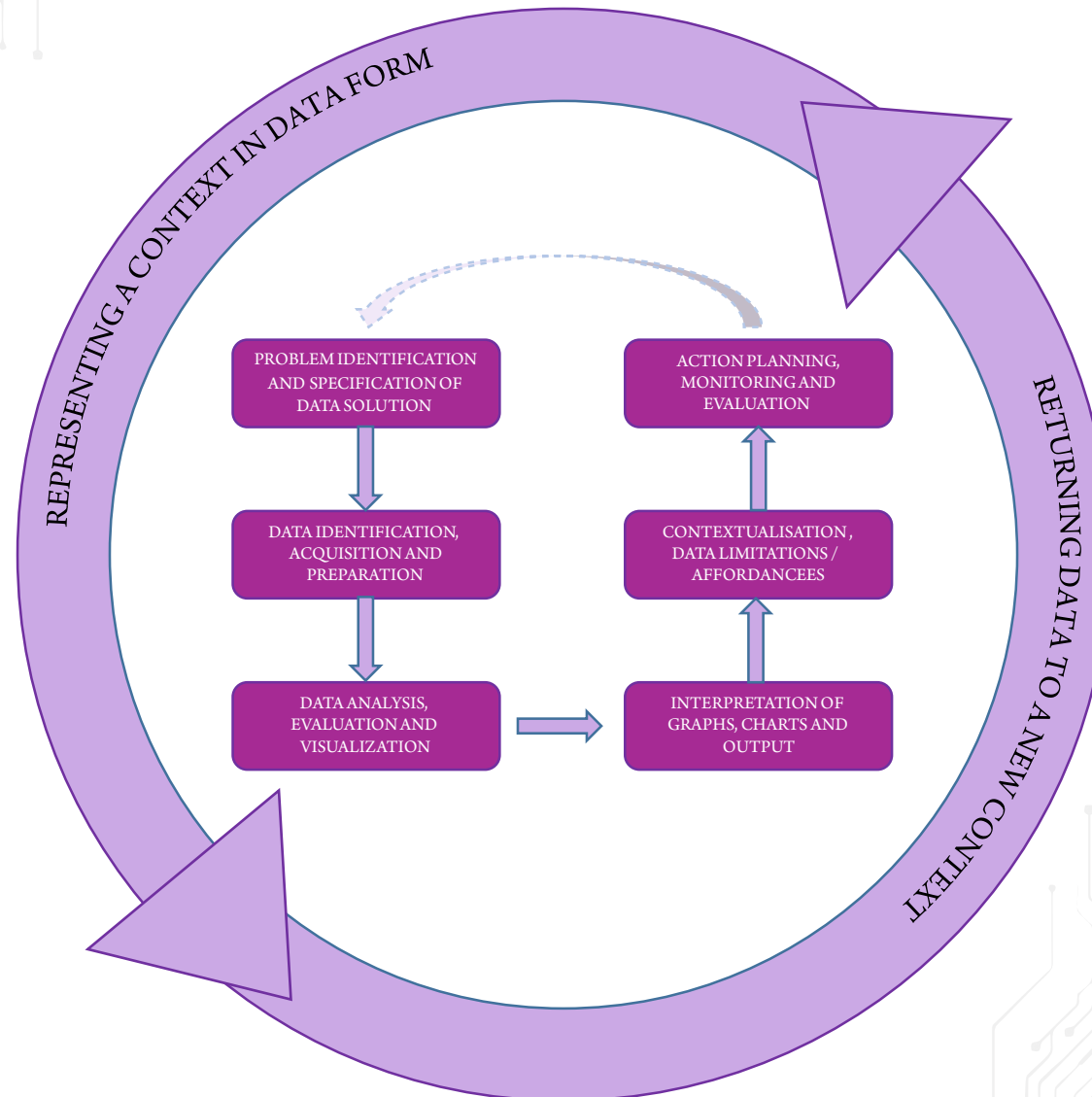
### 4) Leadership & Personal Effectiveness

Our analysts need to be responsible in their organisation, working closely with others to plan, budget, execute and evaluate projects. Our Leadership Framework maps out the skills our members need in order to advance through our membership levels, and in their careers.

This balance of skills represents current best practice in the field and will allow our members to become a valuable asset to any organisation they work for.

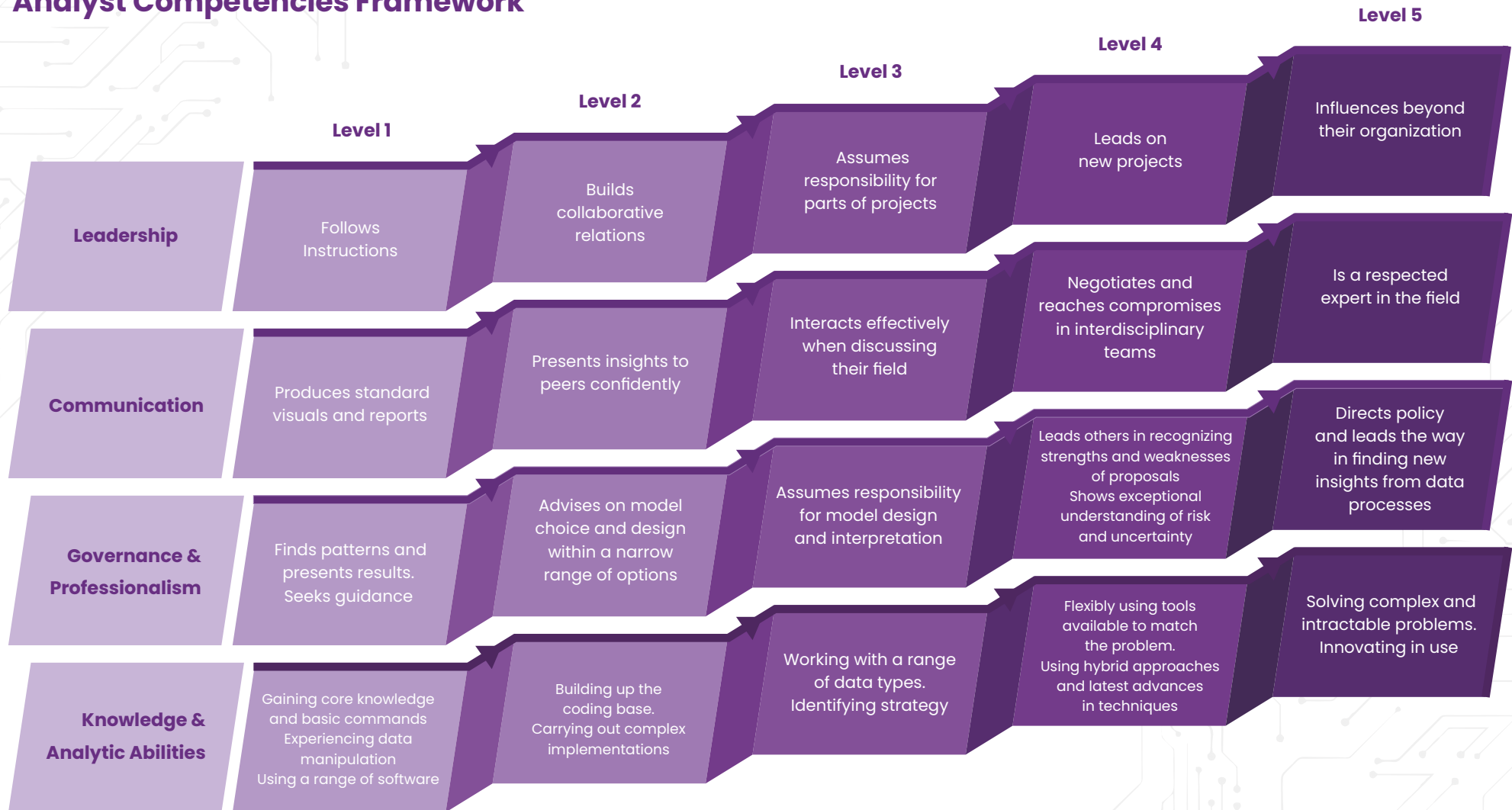
## Solving Problems with Data

We support our members to develop competencies in the end-to-end process of turning data insights into digital transformation.



# Institute of Analytics

## Analyst Competencies Framework



## Training Pathways

Business Analytics and Data Science are large fields with varying entry points for members of the IoA. We need a range of people to engage in analytics:

### Mid-Career and Retraining (While Working)

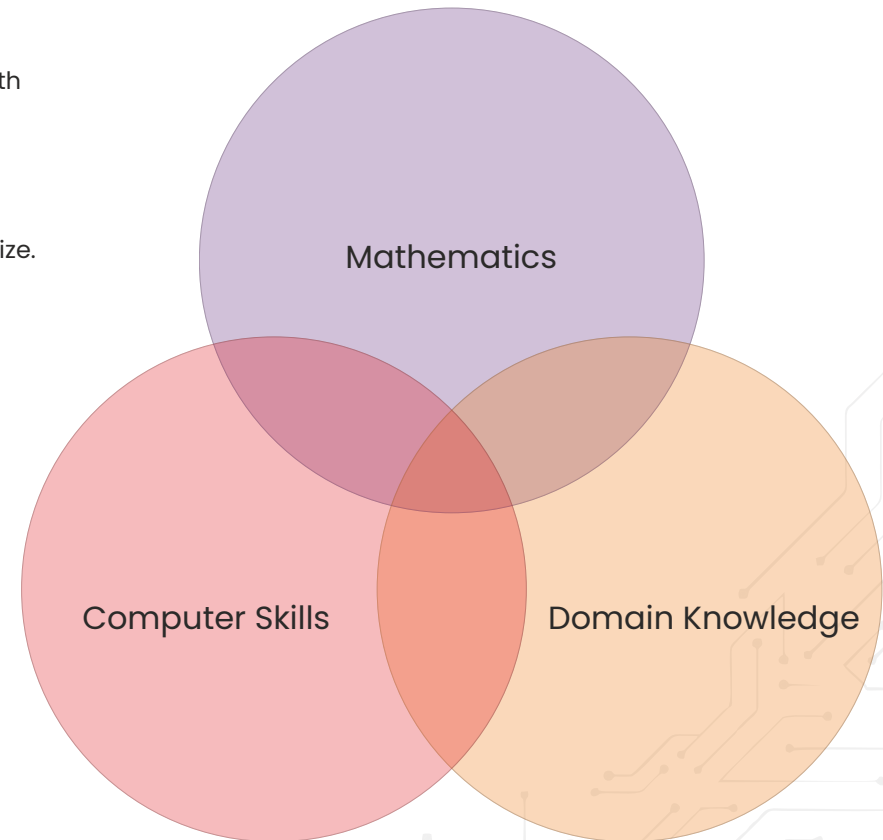
These members will be able to take a leading role in decision-making, bringing their in-depth knowledge of the domain where analytics are to be applied.

### Degree and Masters Route

These members will have completed intensive academic training, which we want to recognize.

### Vocational Training

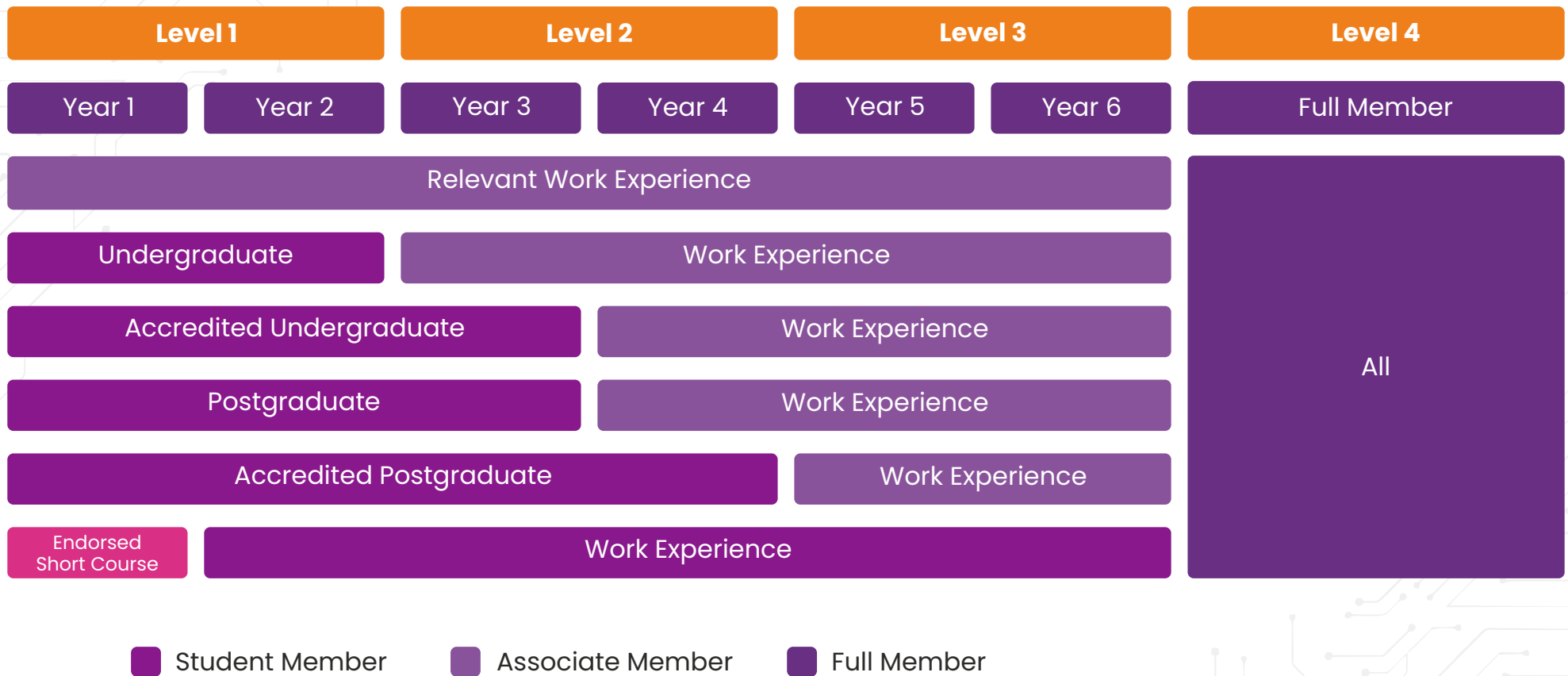
We may also have people starting their careers and carrying out vocational training while they work in a relevant career.



### Analytics Requires a Cross-Section of Skills

Our training pathways on the next page shows how we expect our members to progress through the different levels of membership to become a Full Member of the IoA.

## Training Pathways Through IoA Membership

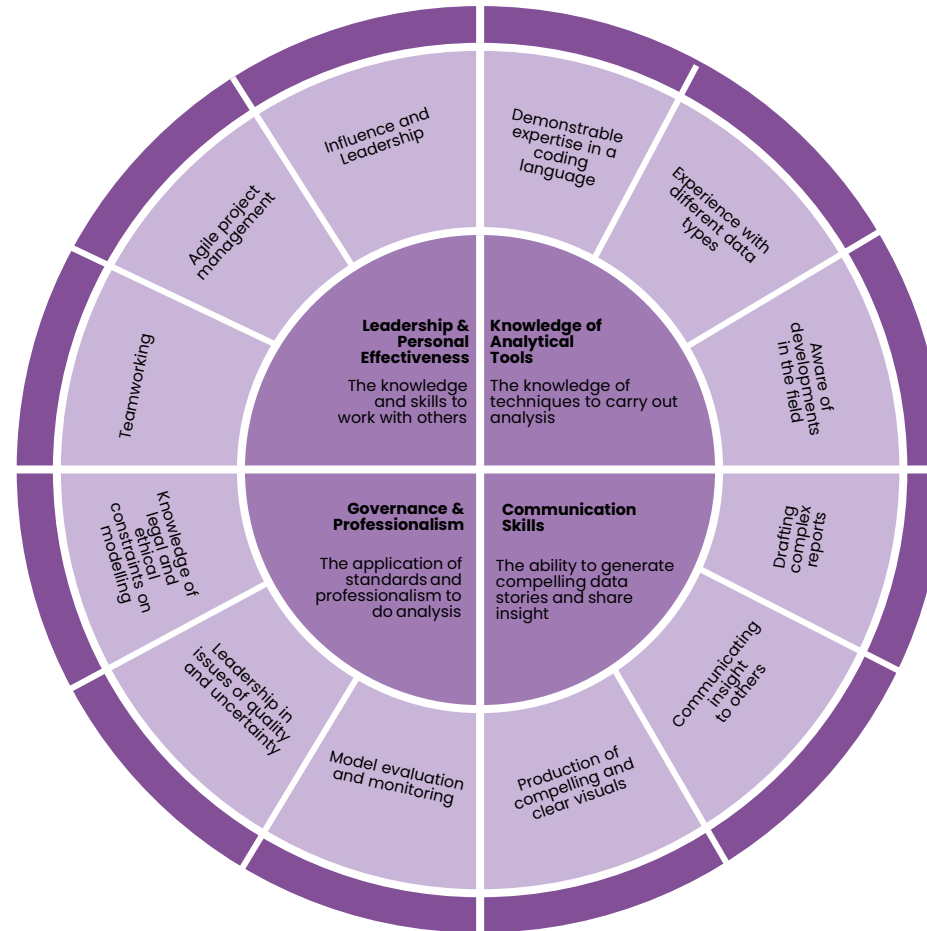


Members have several optional pathways to achieve the highest levels of membership with us, depending on their formal training and experience.



## Skilled Professional

Our members are encouraged to nurture a balance of knowledge, skills and qualities to help them progress in their career.



## Appendix

On the next pages, there is a detailed breakdown of the skills we expect our members to develop during their training with us.

## Core Analyst Progression Competencies

This domain contains the knowledge and technical competencies to be able to carry out excellent data analysis.

Descriptors	Level 1	Level 2	Level 3	Level 4	Level 5
<b>Knowledge &amp; Analytic Competencies</b>					
	<b>Trainee Analyst</b>			<b>Full</b>	<b>Fellow</b>
1. Demonstrable expertise in coding	<ul style="list-style-type: none"> <li>Has at least core knowledge and can carry out basic commands and data manipulation on relational data bases.</li> </ul>	<ul style="list-style-type: none"> <li>Can analyze data efficiently in at least one coding language.</li> <li>Develops detailed and thorough knowledge and understanding of core analysis functions.</li> <li>Demonstrates analytical skills with a limited range of algorithms.</li> </ul>	<ul style="list-style-type: none"> <li>Can analyze data in more than one coding language.</li> <li>Has recourse to less commonly used tools or solutions when necessary.</li> <li>Demonstrates analytical skills with a broad range of algorithms.</li> </ul>	<ul style="list-style-type: none"> <li>Has flexibility in terms of the tools available and will combine hybrid approaches to get optimal results tailored to the situation.</li> </ul>	<ul style="list-style-type: none"> <li>Can solve complex and intractable problems.</li> <li>Can create new solutions.</li> </ul>
2. Experience with different data types	<ul style="list-style-type: none"> <li>Has basic understanding of manipulating relational databases and is working towards using other data types.</li> <li>Makes efficient use of the available resources.</li> </ul>	<ul style="list-style-type: none"> <li>Develops experience with complex implementations of data analysis on real world data sets.</li> <li>Has worked with big data (n&gt;.5 million).</li> <li>Has been exposed to a range of data types and structures commensurate to years of experience and status.</li> </ul>		<ul style="list-style-type: none"> <li>Has considerable experience working with a range of data structures and data types.</li> <li>Has experience analysing large data sets (n&gt; 2 million).</li> </ul>	
3. Aware of developments in the field	<ul style="list-style-type: none"> <li>Knows of a range of relevant tools, software, and coding packages to simplify work and solves simple problems with data wrangling.</li> </ul>	<ul style="list-style-type: none"> <li>Uses up-to-date, well-maintained libraries to perform data pre processing and analysis.</li> <li>Has a demonstrable strategy to stay ahead in the data analytics field (e.g. reading industry reports monthly, attending conferences, participating in online networking, registering for formal training).</li> </ul>		<ul style="list-style-type: none"> <li>Knows of recent advances in data analysis and processing.</li> </ul>	<ul style="list-style-type: none"> <li>Familiar with technologies close to maturity in data analysis that will impact the field of analytics.</li> </ul>

## Core Analyst Progression Skills

This domain contains the knowledge and technical skills to be able to carry out accountable data analytics processes.

Descriptors	Level 1	Level 2	Level 3	Level 4	Level 5
<b>Governance &amp; Professionalism</b>					
	<b>Trainee Analyst</b>			<b>Full</b>	<b>Fellow</b>
1. Knowledge of legal and ethical constraints on modelling	<ul style="list-style-type: none"> <li>Can describe common issues around IP, data privacy and local legislation around data use.</li> <li>Seeks advice before implementing analysis.</li> </ul>	<ul style="list-style-type: none"> <li>Acts within legal frameworks relevant on a local level.</li> <li>Seeks advice on novel uses of analysis.</li> <li>Seeks advice on novel uses of analysis before implementing analysis.</li> </ul>	<ul style="list-style-type: none"> <li>Assumes responsibility for working within legal frameworks at all times.</li> <li>Advises peers and less experienced staff.</li> </ul>	<ul style="list-style-type: none"> <li>Knows of and disseminates recent changes in legal requirements.</li> <li>Advises colleagues and superiors on legality of analytics processes.</li> <li>Contributes to organizational policy.</li> </ul>	<ul style="list-style-type: none"> <li>Knows of impending changes to legal frameworks that affect analytics.</li> <li>Is active in promoting and implementing ethical analytics.</li> </ul>
2. Model evaluation	<ul style="list-style-type: none"> <li>Can describe data sets in detail.</li> <li>Can find patterns and draw attention to important trends in data.</li> <li>Benefits from guidance of others.</li> </ul>	<ul style="list-style-type: none"> <li>Can critically describe data sets in detail.</li> <li>Can advise on model choice within a narrow range of options.</li> <li>Sees connections between own results and the wider literature on analytics.</li> </ul>	<ul style="list-style-type: none"> <li>Has well developed analytical skills with a range of models.</li> <li>Produces thorough analysis specifically adapted to scenarios.</li> <li>Can identify and describe potential bias or sampling issues with data.</li> </ul>	<ul style="list-style-type: none"> <li>Leads in recognizing strengths and weaknesses of output and makes connections across data sets.</li> <li>Develops the understanding of models among junior colleagues.</li> <li>Audits the findings of others.</li> </ul>	<ul style="list-style-type: none"> <li>Has outstanding analytical abilities.</li> </ul>
3. Monitoring	<ul style="list-style-type: none"> <li>Is able to review own work.</li> <li>Can clean a data set ready for analysis.</li> <li>Can address feedback from others.</li> </ul>	<ul style="list-style-type: none"> <li>Can describe common issues of quality and transparency in analysis.</li> <li>Takes steps to remove quality issues where possible.</li> <li>Can describe concerns around limitations.</li> <li>Investigates issues that arise.</li> </ul>	<ul style="list-style-type: none"> <li>Can describe limitations in quality and issues of certainty in detail.</li> <li>Participates actively in setting up and monitoring contestable pipelines.</li> </ul>	<ul style="list-style-type: none"> <li>Can give a full evaluation and make recommendations on the affordances and limitations of analytics processes.</li> <li>Takes full responsibility for setting up contestability processes.</li> <li>Can identify all relevant stakeholders that need to be engaged.</li> </ul>	<ul style="list-style-type: none"> <li>Has recognised status as a responsible analyst.</li> <li>Is routinely subject to peer review.</li> <li>Is routinely asked to review the work of others.</li> </ul>

## Core Analyst Progression Skills

This domain contains the knowledge and analytical skills to share insights around the processes and outputs of analysts' work with others.

Descriptors	Level 1	Level 2	Level 3	Level 4	Level 5
<b>Communication Skills</b>					
	<b>Trainee Analyst</b>		<b>Full Fellow</b>		
1. Production of compelling, clear visuals	<ul style="list-style-type: none"> <li>Has at least core knowledge and can carry out basic commands and produce visuals from simple relational data bases.</li> </ul>	<ul style="list-style-type: none"> <li>Produces visuals that are tailored to the story told.</li> <li>Embeds graphics in reports to aid decision making.</li> </ul>	<ul style="list-style-type: none"> <li>Produces visuals using up to date techniques.</li> <li>Avoids visual deception.</li> <li>Makes consistently sensible data encoding choices.</li> <li>Uses visuals to aid decision making.</li> </ul>	<ul style="list-style-type: none"> <li>Produces engaging graphics without compromising on integrity.</li> <li>Embeds graphics within data stories and reports seamlessly.</li> <li>Maintains advanced level knowledge of visualization techniques.</li> </ul>	
2. Communicating insight to others	<ul style="list-style-type: none"> <li>Has basic understanding of rhetoric.</li> <li>Articulates ideas clearly.</li> <li>Is approachable and shows consideration for others.</li> </ul>	<ul style="list-style-type: none"> <li>Presents work confidently to peers.</li> <li>Recognises the value of ideas outside of analytics in shaping data policy.</li> <li>Listens, gives, receives and responds to feedback.</li> </ul>	<ul style="list-style-type: none"> <li>Is confident in face-to-face interactions.</li> <li>Has presented results formally to a group.</li> <li>Actively engages in knowledge exchange with others.</li> </ul>	<ul style="list-style-type: none"> <li>Has experience negotiating compromises between conflicting interests.</li> <li>Is able to vary communicative approach taken to the audience.</li> <li>Can persuade and influence others.</li> <li>Is open to alternative interpretations and ideas.</li> </ul>	
3. Drafting complex reports	<ul style="list-style-type: none"> <li>Can report on own work.</li> <li>Can report on the work of others.</li> <li>Is willing to learn new methods.</li> </ul>	<ul style="list-style-type: none"> <li>Constructs coherent arguments around data results.</li> <li>Understands how reports are evaluated and implemented in real world contexts.</li> <li>Can critically evaluate own reports after a period of time or in response to feedback.</li> </ul>	<ul style="list-style-type: none"> <li>Can communicate data outputs to a specialist audience and diverse non-specialist audiences.</li> <li>Regularly produces reports that will guide decision making.</li> </ul>	<ul style="list-style-type: none"> <li>Makes the complex accessible to all.</li> <li>Has assessed the quality of other people's work formally.</li> <li>Has published results in a report that has been subject to external review.</li> </ul>	

## Core Analyst Progression Skills

This domain contains the personal traits and skills to participate in teams and lead others towards greater data literacy.

Descriptors	Level 1	Level 2	Level 3	Level 4	Level 5
<b>Leadership &amp; Personal Effectiveness</b>					
	<b>Trainee Analyst</b>			<b>Full</b>	<b>Fellow</b>
1. Teamworking	<ul style="list-style-type: none"> <li>Is aware of the value of working collaboratively.</li> <li>Is respectful of individual difference.</li> </ul>	<ul style="list-style-type: none"> <li>Builds collaborative relationships with a range of colleagues.</li> <li>Promotes the value of evidence-based decision making respectfully.</li> </ul>	<ul style="list-style-type: none"> <li>Manages and negotiates collaborations and team projects.</li> <li>Makes positive use of diversity of skills and difference to enrich work.</li> </ul>	<ul style="list-style-type: none"> <li>Actively builds collaborative relationships and leads on setting the standards of diverse participation.</li> <li>Acknowledges the results of the team.</li> </ul>	
2. Communicating insight to others	<ul style="list-style-type: none"> <li>Applies effective time management to achieve a complex project deadline.</li> <li>Acts on decisions agreed by a supervisory team.</li> </ul>	<ul style="list-style-type: none"> <li>Independently defines the time-scale, resources and objectives of a small Project.</li> <li>Understands and tracks the project management process.</li> <li>Responds to issues as they arise.</li> </ul>	<ul style="list-style-type: none"> <li>Independently defines the time scale, resources and objectives of a large project.</li> <li>Clarifies priorities, expectations and setbacks.</li> <li>Takes decisions on issues arising.</li> </ul>	<ul style="list-style-type: none"> <li>Defines the time scale, resources and objectives of a complex project.</li> <li>Accepts responsibility for risk management.</li> </ul>	<ul style="list-style-type: none"> <li>Builds longer term plans for data strategy.</li> </ul>
3. Influence and leadership	<ul style="list-style-type: none"> <li>Maintains enthusiasm for work.</li> <li>Takes responsibility for projects within own expertise.</li> <li>Takes guidance and follows instruction well.</li> <li>Recognises the implications of own work in real life applications.</li> </ul>	<ul style="list-style-type: none"> <li>Takes responsibility for a range of projects.</li> <li>Acts with integrity and professionalism.</li> <li>Offers ideas that encourage others to think differently.</li> <li>Takes care when handling the data of others and in reporting.</li> <li>Seeks advice when appropriate.</li> </ul>	<ul style="list-style-type: none"> <li>Influences, leads and protects less experienced data scientists.</li> <li>Takes responsibility for key decisions.</li> <li>Perseveres through difficulties.</li> <li>Acts as a role model to more junior colleagues.</li> <li>Seeks advice and supports colleagues when appropriate.</li> </ul>	<ul style="list-style-type: none"> <li>Is recognized as making a significant contribution to own organization.</li> <li>Sets expectations and standards of conduct for others.</li> <li>Inspires enthusiasm in others in their own area of data analytics.</li> <li>Seeks advice and supports colleagues when appropriate.</li> </ul>	<ul style="list-style-type: none"> <li>Has exceptional influence and input is sought from external bodies.</li> <li>Leads on large and complex projects.</li> <li>Inspires communities to engage more with data analytics.</li> <li>Seeks advice and supports colleagues when appropriate.</li> </ul>

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The Global Body for Analytics

The Future is Here.

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