Department for Education

Responsible Technology Adoption Unit

Introduction to data analytics and the development process

For local authorities developing data analytics tools in children's social care

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Contents

Summary

This publication provides non-statutory guidance from the Department for Education.

It has been produced to help those in children's social care to better understand data analytics, specifically for those who want or need to understand more about:

- the opportunities and risks of using data analytics tools
- the typical process to develop a data analytics tool.
- the role of responsible innovation
- the role of senior leaders in developing a culture that values data

Who this publication is for

This guidance is for:

- senior leaders, managers and commissioners in children's services
- child and family practitioners who:
    - use data
    - work with children and families
    - make decisions that affect children and families
- data practitioners who have not previously developed or used data analytics tools

Main points

When they are used safely and responsibly, data analytics tools can provide insights which improve decision-making and the provision of children's services. For example, they may help to:

- proactively identify at-risk children
- evaluate service provision
- prioritise and inform resource allocation
- support wider research and policymaking around vulnerable children

The use of data analytics tools also brings risks, including that:

- inaccurate insights might be used by practitioners to inform decisions
- children and families receiving support and care may have less privacy
- developing data analytics tools can require technical expertise and funding

Introduction to data

In simple terms, data is just information. Data can refer to:

- **Numbers**: How many children receive support from child and family practitioners in your local authority; average age of a child who enters the care system; amount of money Children's Services spends on foster placements each month.
- **Personal information**: Name and address; medical conditions; which services they have interacted with or received support from.

Every day, local authorities and other public services collect and record data about children and families who may be vulnerable and need support. It is often held in separate databases and systems. For example:

- **School**: Information recorded by a designated safeguarding lead logging concerns about a child.
- **Police**: Information recorded by a police officer about a domestic abuse call-out that happens within a child's home.
- **Children's social care**: Information recorded in case notes by a front door multi-agency safeguarding hub worker which includes details of events that have led to a referral about a child to children's social care.

Frontline practitioners, managers and senior leaders in children's services use data daily to help them make decisions. This can enable more informed decision making, to improve outcomes for children and families.

Introduction to data analytics

Humans on their own will often struggle to analyse lots of data. Data analytics tools can analyse large quantities of data to:

- spot patterns
- categorise and collate a large amount of information
- help to form a bigger picture of events or things that have happened or could happen.

Data analytics tools can be useful across operational and strategic decision-making in children's social care by:

- identifying individual children and families who are likely to need support
- prioritising and informing decisions around resource and funding allocation
- setting out patterns and factors in vulnerability
- evaluating service provision

How data analytics works

Data practitioners will take data and make or perform a calculation on this data.

There are three different types of data analytics:

- Descriptive analytics: What happened?
- Diagnostic analytics: Why did it happen?
- Predictive analytics: What is likely to happen?

Using data analytics will develop insights, trends or predictions, which can be shown in visual form through dashboards to decision-makers. A decision maker will use the insights to reach a decision and take an action.

The importance of human input by subject experts

Data may only tell you so much, and there is always context beyond the numbers. It's vital to have human input in order to make decisions and take action.

The expertise and subject knowledge of professionals in children's services should always be involved in interpreting and scrutinising insights from data analytics tools. This will help to support more informed decision-making.

Descriptive, diagnostic and predictive analytics

Descriptive analytics

- typically involves performing basic calculations on data, such as counting or summing
- can often be done in spreadsheets, e.g. Microsoft Excel
- can show how many times something has happened in the past, and how it has changed over time
- can support more informed understanding of an issue, in order for a practitioner, manager or senior leader to make a decision and take action
- can more broadly support performance reporting and benchmarking against local authorities in a particular area, region or nationally.

Diagnostic analytics

- can help to explain why things are happening
- applies statistical techniques to find patterns and correlations in historical and past data that may indicate causal relationships

Predictive analytics

- can help to estimate what is likely to happen. It can help to better understand future scenarios.
- can, but does not always, involve training a supervised machine learning model or algorithm on large volumes of historical data. It then applies the model to data, to make inferences or predictions based on new data.

Examples of data analytics tools in children's social care

Data analytics tools can be used across the provision of children's services. The following are some examples of ways data analytics could be used in this sector.

Early Help

- Using descriptive analytics to identify where families may qualify for preventative programmes and support for early help teams. Bringing together datasets can help

to identify children who qualify for funded programmes and support, for example the Supporting Families programme, and who aren't currently receiving help from it.

- Using diagnostic analytics to help identify which children are most likely to be at-risk for social workers and managers: Common examples include identifying children who are most likely not to be in education, employment or training (NEET) or ready for school at five.

Referral/ assessment stage

- Using descriptive analytics to create a dashboard which collates information about a child and their family for social workers.
- Using descriptive analytics to collate data about social worker caseloads for managers: tools can help managers to proactively identify when case numbers per practitioner are likely to be unmanageable.

Looked after children

- Using predictive analytics to support the matching and placement of children for commissioners and looked after children teams.
- Using diagnostic analytics to provide insights about service provision for managers and senior leaders.

Responsible and trustworthy innovation

Data ethics is a set of principles, tools and processes for managing and governing data and data-driven technologies.

As an approach, it bridges the gap between legal compliance (what you must do) and the public's expectations around good practice (what you ought to do).

It can enable organisations to demonstrate that they have taken decisions appropriately, supporting innovation that is more likely to be trusted by the public.

Guiding principles for responsible innovation

This guidance is based on a set of ethical principles, developed by the What Works Centre for Children's Social Care (now Foundations - What Works Centre for Children and Families), which combine guidelines on ethical AI with guidelines for child and family practitioners.[1]

- fair, sustainable and ever-improving social care
- social care that supports and empowers
- transparent, responsible and accountable social care

Conditions for responsible innovation

Below, we consider what the principles above mean for those developing data analytics tools in a way which is responsible and trustworthy. Many of these conditions are requirements for a tool to function and perform effectively, and you may already have these conditions in place.

The **guidance for developing data analytics tools, explainers** and **ethics workbook** will explore each of these conditions.

Co-design with affected stakeholders

It is important to have meaningful engagement with affected stakeholder groups across the design, development and use of data analytics tools. Co-design should support and protect children's rights, including their best interests, wellbeing and their right to express their views. Co-design can also help to make sure that the tool is designed for end users.

Affected stakeholder groups may include:

[1] They were developed by the Alan Turing Institute and Rees Centre, and **published by** What Works Children's Social Care:

- child and family practitioners and experts
- those with lived experience
- community organisations who support them, and can represent their views.

Good data quality

Any data analytics solution requires there to be good data quality to base it on. Data quality is best understood as the ‘fitness for purpose’ of a dataset, and can be defined as data which is representative, relevant, recent and accurate. Poor quality data means data which contains:

- errors or inaccuracies
- bias
- duplications
- missing or out of date information
- incompatibility, for example, data stored in different formats

Data analytics tools which are developed on poor quality datasets can lead to ineffective or harmful interventions, and poor quality decision making. This may lead to negative or biased outcomes for children and families.

Children's service teams seeking to develop their data analytics capabilities should prioritise data quality. Senior leaders are strongly advised to invest resources into appropriate interventions and mechanisms for ongoing maintenance and improvement of data quality.

Ensuring good data quality is a continual process that requires:

- developing a culture where data is valued
- ensuring that child and family practitioners are provided with easy-to-use systems for recording data
- staff who are empowered to dedicate time and effort in improving data quality.

Appropriate resource, capacity and expertise

You should have adequate resources and expertise in place to develop, manage and review data analytics tools. Where you don’t have the right expertise, you may need to engage with third parties for support. Expertise may include:

- child practitioners, technical, legal, information governance expertise within the local authority
- safeguarding partners and organisations
- academics
- civil society groups
- consultancies and software developers

Effective governance and accountability

There should be effective governance mechanisms to set boundaries on the tool's purpose and intended use to avoid mission creep, test assumptions, and monitor and scrutinise use. Those scrutinising the tool should have a good understanding of the risks and benefits it poses, to support an informed judgement about whether data analytics tools should be developed and used. Effective governance should be established early on in development, and continue as a tool is deployed. The **explainer on governance and oversight** has more information.

Mitigating bias

Bias can enter into a data-driven process at different points. Technical, organisational and legal steps should be taken to support fair outcomes and mitigate bias. This includes meeting the public sector equality duty, outlined in the Equality Act. The **explainer on mitigating bias has** more information.

Supporting safety through privacy and security

Adopting secure privacy-preserving methods for sharing and using data can help to demonstrate that you are meeting data protection law and preserving an individual's privacy.

Robust testing and evaluation

Robust technical design and architecture which can be audited and interpreted can help to make sure that a tool remains effective and relevant. Testing and regular review should identify unintended consequences, either in the tool's insights or the way that it is being used.

Meeting legal requirements

You should adhere to legal requirements, using relevant impact assessments to support you to meet these requirements. Legislation will likely include:

- child protection
- human/ children's rights
- data protection
- equality and discrimination

Transparent and explainable communication

You should communicate publicly about how you have developed and use data analytics tools. This includes details about:

- rationale for the tools' development and use
- intended outcomes, impact assessment, and results from any evaluation
- technical details
- lessons for the wider local government sector.

Innovative culture and commitment to data maturity

Ensuring responsible innovation often requires a commitment to improving data maturity and valuing data in children's social care. You should consider how existing processes may need to adapt to incorporate new innovation, for example existing ways of working, and adapting policies, processes and culture as necessary to support sustainable innovation.

Development lifecycle

Below, we have outlined a high-level overview of the development lifecycle which is explained in the **guidance for developing data analytics tools**. It should be followed by those developing, or managing the development of, a data analytics tool.

Explore phase

- Explore technical and organisational capability to decide whether a data analytics tool is possible
- Engage with children's service teams to explore problems and identify good outcomes
- Explore available datasets, expertise and resources, and decide on a tool to be developed
- Identify and address ethical risks, put appropriate governance in place, begin impact assessments, and complete a business case

Develop phase

- Understand user requirements, explore acceptable data use, and co-design outcomes
- Explore and test mechanisms to protect privacy, iterate a prototype, and develop feedback loops
- Complete systems (alpha and beta) testing, and user testing
- Consider public communication and evaluation, seek appropriate sign off to implement the tool, and complete user training and upskilling

Implement phase

- Begin evaluation of the tool, and publicly share information about it
- Review and update the tool, including continued engagement with users and affected stakeholders
- Where the tool isn't meeting expected outcomes or is no longer relevant, take the tool out of commission

Next steps

When you have read this **Introduction to data analytics**, you may wish to:

- engage with data analysts in children's services to explore whether data analytics is possible in your context. Data practitioners should refer to the **guidance for developing data analytics tools** to understand the steps they would need to take
- learn more about common data challenges that local authorities face, and how you can address them. You can refer to the **explainer** topics
- improve data quality to put the right foundations in place for using data effectively to inform decision-making in children's services

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