

Causes & impacts of bias

This planning document is intended to support teachers who are delivering the NPA/PDA Data Science or for students who are learning independently. It also aligns with the Data Skills for Work framework.

Contents

Version Control	1
Lesson Description	2
Lesson Contents	2
Learning Intentions	3
Success Criteria	3
Knowledge Prerequisites	3
Lesson Requirements	4
Task-types	5
Worksheet	6
How you can use this lesson	7
Alternative format	7

Version Control

Version number	Purpose/Change	By	Date
1.0	Published by effini	Emma Nylk	3 Oct 2022

Lesson Description

Lesson Overview	What is bias and the causes of bias How to mitigate against data bias.
Topic	Data Ethics
Book Chapter(s)	Data Ethics

NPA level	4, 5, 6
PDA level	7, 8
Data skills for work level	Data management, Core, Data Leadership

Lesson Contents

This lesson consists of:

- A lesson plan (this document)
- A PowerPoint/PDF presentation, 'Causes & impacts of bias'
- Question worksheet (for learners) on 'Causes & impacts of bias' in Excel/PDF
- Answers worksheet (for teachers) on 'Causes & impacts of bias' in Excel/PDF

Learning Intentions

We will be looking at the **data bias**, specifically

- What is data bias
- What can cause data bias
- How to mitigate against data bias

Success Criteria

I can *explain* what is meant by data bias

I can *explain* what can cause and impact data bias

I can *explain* how to mitigate against data bias

Knowledge Prerequisites

Learners should know:

- what data is
- data can be transformed into valuable information
- data can be used to solve problems and find answers to questions
- how data can be misused by individuals, organisations and society
- how data can be misused/used ethically

Lesson Requirements

	PDA	NPA	Data Skills for work
Qualification	Yes	Yes	Yes
Outcome ID(s)	WD7.1d, CD7.2f, WD8.2f, CD8.1f	DC4.1c, DC4.1d, DC5.1c, DS5.1c DC6.1c, DC6.3b	C1.4, C2.1, DM1.1, DM1.2, DM1.3, DM3.1, DM3.3, DL1.2, DL2.3
Outcome description(s)	WD7.1d – Data quality including bias CD7.2f – Data bias and ways to reduce bias WD8.2f – Data quality including data bias CD8.1f - Data quality and data bias	DC4.1c – State the types of data bias and its impact on society, DC4.1d – Identify sources of bias in data science including historical bias, DC5.1c – Describe types of data bias and its impact on individuals and society, DS5.1c – Describe the data science life cycle including the potential for bias at each stage, DC6.1c – Explain types of bias and its impact on individual and society, DC6.3b – Evaluate a dataset in terms of its quality including potential bias	C1.4 - Use and misuse of data by individuals, organisations and society C2.1 – Vocabulary used in data science and analytics DM1.1 – Making ethical decision using data DM1.2 – Understanding bias DM1.3 – Impacts of bias DM3.1 – Data standards DM3.3 – Data governance processes DL1.2 – Data risks and challenges DL2.3 – Data processes and culture
Level	7, 8	4, 5, 6	Data management, Core, Data Leadership
Software language	N/A	N/A	N/A
Required equipment /software for student	Lesson: PowerPoint/PDF, Worksheet: Excel/PDF	Lesson: PowerPoint/PDF, Worksheet: Excel/PDF	Lesson: PowerPoint/PDF, Worksheet: Excel/PDF

Task-types

In the worksheet for this lesson, there are up to 6 task-types to that become increasingly challenging to support the students learning. Based on the student's previous knowledge it is possible to select the task-types that are relevant to their stage.

Task-type	Description
1. Recall	To be able to recognise definitions or procedures.
2. Define	To be able to define definitions or procedures.
3. Rephrase	To be able to use their own words to describe definitions or procedures.
4. Apply	To be able to apply definitions or procedures to problem-solving activities.
5. Create	To be able to apply definitions or procedures and create their own solutions to a defined problem.
6. Active	Using knowledge from the lesson which they apply to scenarios they have researched/designed themselves.

Worksheet

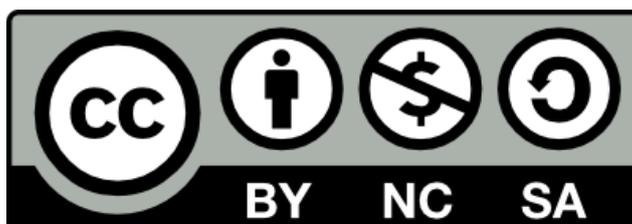
The worksheet associated with this lesson is available either in Excel or as a PDF that can be printed. The answer worksheet is available in both formats too.

Worksheet section ID	Description	Task-type	Number of questions
1.1	Types of data bias	Recall	1
1.2	Types of data bias	Apply	1
1.3	Types of data bias	Active	3
2.1	Causes and mitigation of data bias	Recall	1
2.2	Causes and mitigation of data bias	Rephrase	3
2.3	Causes and mitigation of data bias	Active	1
Total			10

How you can use this lesson

This lesson has been created by effini in partnership with Data Education in Schools and Skills Development Scotland.

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Alternative format

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