**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.

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# Version Control

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| --- | --- | --- | --- |
| Version number | Purpose/Change | By | Date |
| 1.0 | Published by effini | Emma Nylk | 3 Oct 2022 |
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# 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 | Rephase | 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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A picture containing text, clipart

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# Alternative format

**If you require this document in an alternative format, such as large print or a coloured background, please contact**

**hello@effini.com**

**or**

**4th Floor, The Bayes Centre**

**47 Potterrow**

**Edinburgh**

**EH8 9BT**