

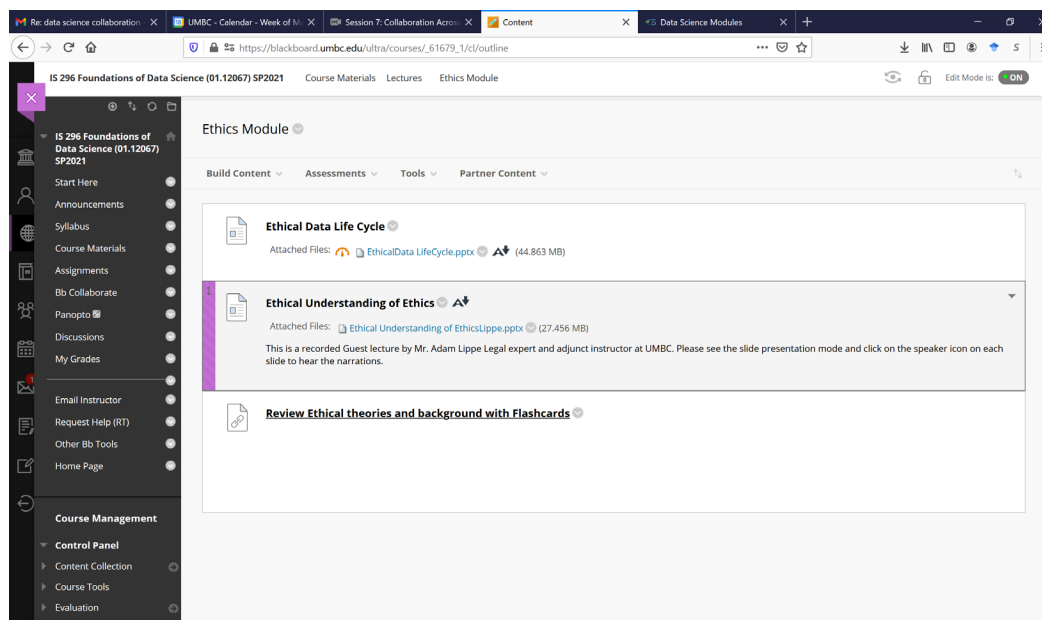
Ethics module: Developed as part of the Hrabowski Innovation fund, PI: Vandana Janeja

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The core module on ethics comprises of one in class and one online component to be done before the in class component. This module is self-contained and can be embedded in any class which deals with data manipulation or data based decision making. It includes the following components:

- The online component will be first exposure to the topics. This component includes introducing the students to scenarios through voice overs and video (such as examples from Cambridge analytics, Google image search to name a few). This will be followed by flash card reviews and quizzes.
- The in class component will either be given by the faculty teaching the class or through a guest lecture comprising of slides with graphics and animations. The in class component will also include student engagement exercises including discussions of case studies and reflection questions. This can be modeled along the lines of the “big debate” exercise. This exercise is done in three phases. First students select papers related to ethics and big data, privacy, challenges in big data to name a few. On the day of the debate students are given leading questions to start the discussion such as, discuss the pros and cons of big data and data science in the context of the paper; what is ethics in the context of data science? Following this, students are given a reflection question where they have to take a side in the big debate and respond with examples in real world datasets they have used for their projects.
- As part of the module, the students are also evaluated with a direct measure of their learning outcomes where scenarios are provided to them with clear ethical dilemmas with real world example datasets. The students are asked to fill in responses with clear ethical decision making whether it be a choice of threshold that eliminates a minority group or filling of missing value in the data that overwrites the income disparities in a geospatial region.
- Jupyter notebooks demonstrating decision making points in programming of algorithms are also available to be used as another lecture. This is useful if the module is being embedded into a more programming heavy class or an advanced data science class.

### Example Snapshots of Coursearc module



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The ethics module gets embedded as a weblink into your course. Students can follow up each part of the module which is hosted in coursearc.

The screenshot displays the CourseArc web application. At the top, a navigation bar includes the CourseArc logo, 'Dashboard', 'Courses', 'Tools', 'Help', and 'Log Out'. Below this, a breadcrumb trail reads: 'Dashboard / IS 296 Foundations of Data Science (01.12067) SP2021 / Ethical considerations for Data Science / Overview 2'. The main content area is divided into three columns. The left column contains a 'Navigation' sidebar with links to 'Overview 2', 'Summary 2', 'Professor Lippe's PowerPoint', 'Case / Fact Scenarios', 'Resources / References / Articles', and 'Activities / Flash Cards', along with an 'Add New Page' button. The middle column features the UMBC logo, a yellow banner for 'IS 296 Foundations of Data Science (01.12067) SP2021', and the title 'Ethical considerations for Data Science'. Below the title is 'Overview 2' and a section 'Ethical Understanding of Ethics' which includes a paragraph about data ethics and two references. The right column contains three panels: 'Edit' (with 'Edit this Page' and 'Previous Versions' buttons), 'Lock Page' (with a 'Lock Page' button), and 'Properties' (with input fields for 'Minutes' and 'Assignments'). At the bottom of the right column are 'To-Dos' and 'Approval' sections.

Navigation

- Overview 2
- Summary 2
- Professor Lippe's PowerPoint
- Case / Fact Scenarios
- Resources / References / Articles
- Activities / Flash Cards
- + Add New Page

IS 296 Foundations of Data Science (01.12067) SP2021  
IS296\_12067\_SP2021

## Ethical considerations for Data Science

### Overview 2

### Ethical Understanding of Ethics

"Data Is Everything and Everything Is Data," according to Canadian blogger Ben Losman in 2017.[1] In 2018, the blog Scidex said the same thing, as did CNN analyst Zachary Wolf in 2020. [2] [3] A Google search of the term leads to thousands of articles with the same conclusion: data is important and has become the key material for continued growth, expansion and expression of our society. In Wolf's article concerned the COVID-19 pandemic and the issues related to the governments (plural) responses. Whether it was the need for quarantine, social distancing or the use of personal protective equipment (PPE), the importance of appropriate health decisions (and maybe science as a whole) is predicated on the gathering, analysis and implementation of data-driven decisions. Questioning the accuracy of the data, its collection, storage and use, implicitly invoked a need for a strong conversation about ethics.

The identification of need to collect data, its availability, collection, storage, retrieval and use is subject to many different approaches to solve many different problems. But what about the role of data scientists? How are data scientists called upon to make decisions as to each of these issues and the related sub-issues? Is there a role for understanding ethics, the distinctions with the concept of morality, and still employ the best ethical decision-making? Profession Janeja, has made the case that there is a need for "analytics" in data science and in studying the issues surrounding ethics.[4] She cannot be more correct.

[1] Ben Larson, "Data is Everything and Everything is Data," (2017) <https://www.techsoupcanada.ca/en/community/blog/data-is-everything-and-everything-is-data>

[2] Scidex, "Data is Everything and Everything is Data," (2018) <https://medium.com/scidex/data-is-everything-and-everyone-is-data-1886cfe2d92>

Version 6 Page last edited on 4/7/2021 at 2:36 PM

Previous Versions

Lock Page

Remember to lock the page when you are finished.

Lock Page

Properties

Minutes:

Assignments:

To-Dos:

There are no To-Dos for this page.

Add a to-do

Approval

The module can be added as a plug into a blackboard course shell

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The screenshot shows a web browser window with multiple tabs. The active tab is 'CourseArc - Ethical consider...', displaying a page titled 'Ethical considerations for Data Science' under the course 'IS296\_12067\_SP2021'. The page is part of a 'Flashcard Transcript' and lists definitions for various ethical concepts. A navigation sidebar on the left includes links to Overview, Summary, PowerPoint, Case / Fact Scenarios, Resources / References / Articles, and Activities / Flash Cards. A right-hand sidebar contains controls for editing the page, viewing previous versions, setting properties (minutes, assignments), managing to-dos, and previewing the content. The main content area shows a large box for 'Definition: Ethics' and a grid of six smaller boxes for 'Definition: Ethics', 'Definition: Morality', 'Definition: Egoism', 'Definition: Utilitarianism', 'Definition: Kantianism', and 'Definition: Virtue Theory'.

Navigation

- Overview 2
- Summary 2
- Professor Lippe's PowerPoint
- Case / Fact Scenarios
- Resources / References / Articles
- Activities / Flash Cards
- + Add New Page

IS296\_12067\_SP2021

## Ethical considerations for Data Science

### Activities / Flash Cards

Definition: Ethics

Flashcard Transcript

Definition: Ethics	Definition: Morality	Definition: Egoism
Definition: Utilitarianism	Definition: Kantianism	Definition: Virtue Theory

Edit this Page

Version 3 Page last edited on 4/7/2021 at 2:33 PM

Previous Versions

Properties

Minutes:

Assignments:

To-Dos

There are no To-Dos for this page.

[Add a to-do](#)

Status

Draft

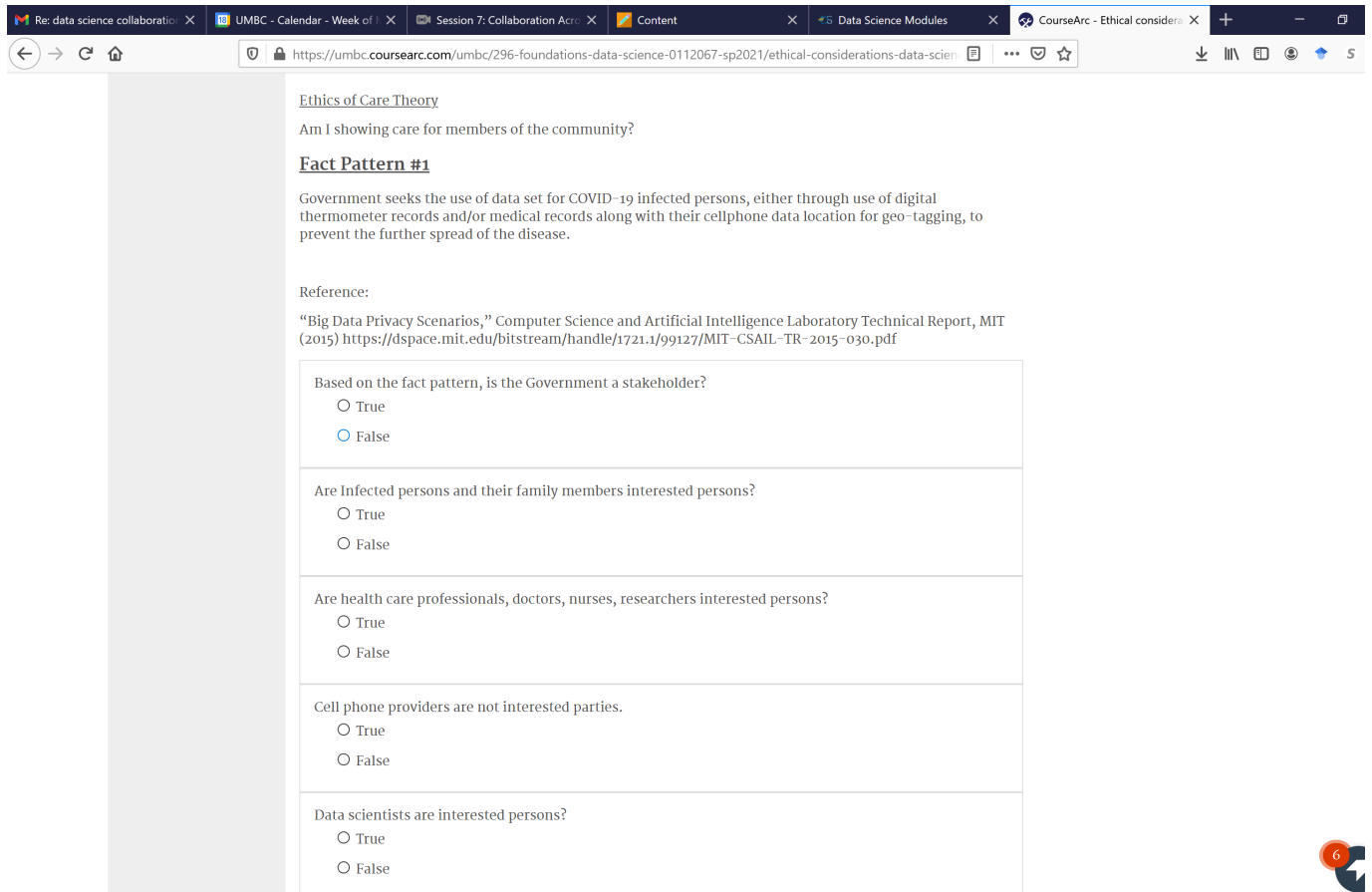
Preview

Select theme:

Preview

Students can practice concepts with Flash Cards

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The screenshot shows a web browser window with multiple tabs. The active tab is titled "CourseArc - Ethical considerations" and displays a URL: <https://umbc.coursearc.com/umbc/296-foundations-data-science-0112067-sp2021/ethical-considerations-data-scien>. The page content includes:

- Ethics of Care Theory**  
Am I showing care for members of the community?
- Fact Pattern #1**  
Government seeks the use of data set for COVID-19 infected persons, either through use of digital thermometer records and/or medical records along with their cellphone data location for geo-tagging, to prevent the further spread of the disease.
- Reference:**  
"Big Data Privacy Scenarios," Computer Science and Artificial Intelligence Laboratory Technical Report, MIT (2015) <https://dspace.mit.edu/bitstream/handle/1721.1/99127/MIT-CSAIL-TR-2015-030.pdf>
- A quiz section with five questions, each with two radio button options: True and False.
  - Based on the fact pattern, is the Government a stakeholder?  
☐ True  
☒ False
  - Are Infected persons and their family members interested persons?  
☐ True  
☐ False
  - Are health care professionals, doctors, nurses, researchers interested persons?  
☐ True  
☐ False
  - Cell phone providers are not interested parties.  
☐ True  
☐ False
  - Data scientists are interested persons?  
☐ True  
☐ False

A small red circular icon with the number 6 is visible in the bottom right corner of the browser window.

Students can take a Fact pattern Quiz responding to their interpretation of various scenarios. This can be linked to Blackboard grades for completion.