



CARIBBEAN
SCHOOL
OF
DATA

CSOD Course

Data Fundamentals

October 27th, 2019

Course: Data Fundamentals

Course Description:

Welcome to the Course "Data Fundamentals". This is the 4th in the CSOD INTRODUCTORY program that seeks to empower young adults with the practical skills for today's Digital economy. These courses are designed to address competency profiles in Digital literacy and Data skills that have become essential for the job markets of today and the future. Participants in this course "Data Fundamentals", will acquire the essential practical skills that will equip them with foundational data competencies such as Data Collection, Organisation, Management, Evaluation and Application to various business scenarios and activities.

This course is broken down into 4 (four) modules namely:

1. Introduction to Data
2. Working with Data
3. Evaluating and Displaying Data
4. Issues to Consider when Applying Data

Purpose of the Course:

In the Digital economy, Data has become a critical and valuable business resource. Data literacy and the ability to collect, organise, manage, evaluate and apply Data to various business scenarios and activities is rapidly becoming an essential 21st century skill. This course introduces students to the fundamentals of data and information, and basic toolkits (including spreadsheets) for collecting, organizing and applying data effectively. Practical techniques are learned to process, manipulate and visualize data using spreadsheets. Students also learn about important data issues such as data quality, security, and privacy and are introduced to good practices for working with Data.

Learning Objectives:

1. Explain the concepts of Data and Information
2. Differentiate between various types of structured and unstructured data
3. Demonstrate how to use the smartphone as a tool for data collection
4. Use basic spreadsheet functions for common data formatting and organization activities
5. Demonstrate techniques to reduce data errors by cleaning
6. Explain critical data issues such as security and privacy and the role they play in data management
7. Demonstrate how to interpret data using visualization tools

Target Audience:

The course is targeted to young adults who have reached the end of high school and/or are beginning to engage in tertiary education, and who have none-to-basic starting digital competencies.

Pedagogical Approach:

Course content has been developed to target young adults who have reached the end of high school and/or are beginning to engage in tertiary education, and who have none-to-basic starting digital competencies.

Content design employs the following pedagogical strategies, suitable for adult learners and amenable to online delivery using web/mobile devices:

- **Adult Learners:** allow for student agency and autonomy; being goal-oriented; heavily practical content and; structured to leverage the learner's experience as well as the local community;
- **Retrieval learning:** Short, modular content with built-in quizzes and repetitive learner assessment in line with content;
- **Alignment:** Module Content has been organized in a logical sequence with clear linkages and alignment to explicit learning objectives
- **Mastery learning:** Modules strive for a progressive, self-paced, directed learning path that allows students to achieve incremental mastery of concepts before moving on to the next
- **Enhanced attention and focus:** Incorporates text and graphical components to create rich, interactive and a much more responsive learner experience
- **Self-Reflection:** Modules provide guides that encourage the student to reflect on the learned concepts and cognitively apply them to familiar contexts

Time Required:

Estimated time to complete each module ranges from 45 – 90 minutes. Additional learning resources are provided to enable students to explore more information on the topics covered.

Programme/Course Assessment:

The assessment done at the course level is based on both formative and summative assessments, and includes:

1. Progressive in-course Assessment (i.e. questions built-into modules)
 - ~ 5-7 questions per module that help students to test and validate their learning and reinforce the concepts

2. Reflection Questions

- A series of 1 - 2 short answer, open ended questions that encourage the student to reflect on the learned concepts and cognitively apply them to familiar contexts

3. A Quiz administered at the end of each Course

- More traditional summative tests/evaluations which attempt to draw together and integrate a number of elements across the modules in a course

Module Outlines:

Below is a brief description, a list of learning objectives and topics for each module of this course:

Module 1: Introduction to Data

Module Description:

This module, "Introduction to Data", introduces the concepts of Data and Information and seeks to provide an increased awareness of the importance of data in the Digital economy. Students gain knowledge and understanding on what data is, different types of data, finding and collecting data, and how to construct information and knowledge from data.

Learning Outcomes:

By the end of the module students will be able to:

1. Explain the concept of data and its importance in the digital economy
2. Distinguish between Data, Information and Knowledge
3. Differentiate between structured and unstructured data
4. Explain the concepts of Big Data, Open Data and Internet of Things
5. Discuss where and how to find and collect data
6. Locate and Retrieve different sources of data

Module Topics:

1. The Concepts of Data, Information and Knowledge
2. The Value of Data in the Digital Economy
3. Categories and Characteristics of Data
4. Big Data, Open Data and Internet of Things
5. Sources of Data
6. Exercise 1: Finding Data Online

Module 2: Working with Data

Module Description:

This module, "Working with Data", is designed to expand the learners knowledge of data and promotes an awareness of managing data. It introduces the concept of the Data pipeline as a methodology for the processing of Data and provides a practical hands-on introduction to topics such as data collection using the smartphone, the importance of data organisation; cleaning data; and converting data from one format to another; creating descriptors; preserving data and making data on the web useful (scraping). The Open Data Kit (ODK) and Google sheets will be used as the primary Data tools for this module.

Learning Outcomes:

By the end of the module students will be able to:

1. Describe the Data Pipeline as a Methodology for data processing
2. Use the Open Data Kit as a mobile data collection tool
3. Discuss common data formatting and layout features
4. Describe how Google Sheets can be used as a data management tool
5. Illustrate at least four (4) ways to reduce data errors by cleaning

Module Topics:

1. The Data Pipeline
2. Using the Open Data Kit (ODK) for Primary Data Collection
3. Exercise: Conducting a Survey using ODK
4. Common Data Formats
5. Data cleaning to reduce errors
6. Sort and Filter: Understanding your Data
7. Exercise: Cleaning the Jamaica Tourism –Hotels Dataset

Module 3: Evaluating and Displaying Data

Module Description:

This module, “Evaluating and Displaying Data”, is designed to provide learners with knowledge on the tools and techniques for evaluating data and the use of Spreadsheets as an analysis and presentation tool. The basic analysis techniques are explored and these include the use of Pivot Tables, how to read charts and graphs, how to create tables, and other visual representation using Google Sheets. Students are provided with a practical hands-on introduction to techniques and tools for analysing and presenting data for storytelling or to generate insight in a manner that suits the target audience.

Learning Outcomes:

By the end of this module students will be able to:

1. Understand what is meant by the term ‘visualisation’ within the context of data and information
2. Describe different variable types
3. Create descriptors for a Dataset

4. Use Pivot Tables to examine and explore a dataset.
5. Interpret and create different Chart types for visualizing data
6. Use Google Sheets as a tool for analysing and presenting data
7. Understand the value of visualizing geospatial data using Maps

Module Topics:

1. What is Data Visualisation?
2. Data Descriptors – Understanding your Data Variables
3. Basic Science of Data Visualization
4. Common Visualization Techniques
5. Using Pivot Tables in Google Sheets
6. Google Sheets as an Analysis and Visualization Tool
7. Mapping Geospatial Data
8. A Data Visualization Exercise

Module 4: Issues to Consider when Applying Data

Module Description:

This module, "Issues to Consider when Applying Data", is taught at the foundational level, providing awareness through knowledge and understanding of the critical issues to be considered when applying data. Emphasis is placed on Data Governance and the technical, legal, cultural and ethical issues to consider to when working with data.

Learning Outcomes:

By the end of this module students will be able to:

1. Describe the principle and activities involved in Data Governance throughout the Data Pipeline
2. Discuss some of the Technical, Legal, Cultural issues associated with Data Governance
3. Discuss at least three (3) Ethical issues that have to be considered when working with data

Module Topics:

1. What is Data Governance?
2. Data Governance Challenges - Technical, Legal, Cultural
3. Good Data Management Practice

Conclusion:

This course consists of 4 modules which, when done successfully, ensures the young adult learners are equipped with the practical knowledge and skills for today's Digital economy. Students will acquire the essential practical skills that will equip them with foundational data competencies such as Data Collection, Organisation, Management, Evaluation and Application to various business scenarios and activities.