Unit Outline (Higher Education)

Institute / School:	Institute of Innovation, Science & Sustainability
Unit Title:	DATA VISUALIZATION
Unit ID:	ITECH3102
Credit Points:	15.00
Prerequisite(s):	(ITECH2303)
Co-requisite(s):	Nil
Exclusion(s):	Nil
ASCED:	020307

Description of the Unit:
This unit introduces students to the core concepts, theories and technologies involved in data visualization. Focusing on transforming various data into images that effectively and accurately represent information about the data, students will develop core skills to discover insights by visualizing data. Students will mainly focus on the learning of core concepts and theory of data visualisation, including data representation and abstraction, marks and channels, visualisation design and analysis of techniques and interaction visualisation design. Students will have the opportunity to engage in areas of study including use of current software tools to design coherent and clear visualization.

Grade Scheme: Graded (HD, D, C, P, MF, F, XF)

Work Experience:

No work experience: Student is not undertaking work experience in industry.

Placement Component: No

Supplementary Assessment: Yes

Where supplementary assessment is available a student must have failed overall in the Unit but gained a final mark of 45 per cent or above, has completed all major assessment tasks (including all sub-components where a task has multiple parts) as specified in the Unit Description and is not eligible for any other form of supplementary assessment

Course Level:

Level of Unit in Course	AQF Level of Course					
	5	6	7	8	9	10
Introductory						
Intermediate						
Advanced			✔			

Learning Outcomes:

Knowledge:

K1. Analyze the visual process needed to design effective data visualizations.

K2. Examine basic theories and techniques that underpin data visualization such as marks & channels, interactive visualization design and related frameworks.

K3. Select appropriate visualizations for particular types of data and for different goals.

Skills:

S1. Formulate appropriate questions based on given datasets and apply a variety of visualisation techniques to visualise data and effectively answer the questions.

S2. Design and implement visualizations that effectively communicate data by using a range of techniques and software tools.

S3. Select and use appropriate visualisation idioms to create and manipulate visual representations.

Application of knowledge and skills:

A1. Interpret principles of human perception and cognition to visualization design.

A2. Design and implement interactive data visualization systems by using storytelling principle, textual, numeric, graphical and other visualization methods to the target audience.

A3. Evaluate data visualization systems and other forms of visual presentation using related visualization principles.

Unit Content:

Topics may include:

- Introduction to data visualization
- Visual perception and applications
- Marks and Channels
- Data and Data Abstraction
- Arrange tables
- VIS design approaches : Task abstraction and rules of thumb
- VIS design approaches : Interaction design
- Storytelling with data visualization, Dashboard design approaches
- Map color and other channels
- Other channels
- Case studies.

FEDTASKS

Federation University Federation recognises that students require key transferable employability skills to prepare them for their future workplace and society. FEDTASKS (**T**ransferable **A**ttributes **S**kills and **K**nowledge) provide a targeted focus on five key transferable Attributes, Skills, and Knowledge that are be embedded within

curriculum, developed gradually towards successful measures and interlinked with cross-discipline and Co-operative Learning opportunities. *One or more FEDTASK, transferable Attributes, Skills or Knowledge must be evident in the specified learning outcomes and assessment for each FedUni Unit, and all must be directly assessed in each Course.*

FEDTASK attribute and descriptor		**Development and acquisition of FEDTASKS in the Unit**	
		Learning Outcomes (KSA)	**Assessment task (AT#)**
FEDTASK 1 Interpersonal	Students will demonstrate the ability to effectively communicate, inter-act and work with others both individually and in groups. Students will be required to display skills in-person and/or online in: • Using effective verbal and non-verbal communication • Listening for meaning and influencing via active listening • Showing empathy for others • Negotiating and demonstrating conflict resolution skills • Working respectfully in cross-cultural and diverse teams.	Not applicable	Not applicable
FEDTASK 2 Leadership	Students will demonstrate the ability to apply professional skills and behaviours in leading others. Students will be required to display skills in: • Creating a collegial environment • Showing self -awareness and the ability to self-reflect • Inspiring and convincing others • Making informed decisions • Displaying initiative	Not applicable	Not applicable
FEDTASK 3 Critical Thinking and Creativity	Students will demonstrate an ability to work in complexity and ambiguity using the imagination to create new ideas. Students will be required to display skills in: • Reflecting critically • Evaluating ideas, concepts and information • Considering alternative perspectives to refine ideas • Challenging conventional thinking to clarify concepts • Forming creative solutions in problem solving.	K1, K3	AT3

FEDTASK attribute and descriptor		Development and acquisition of FEDTASKS in the Unit	
		Learning Outcomes (KSA)	Assessment task (AT#)
FEDTASK 4 Digital Literacy	Students will demonstrate the ability to work fluently across a range of tools, platforms and applications to achieve a range of tasks. Students will be required to display skills in: • Finding, evaluating, managing, curating, organising and sharing digital information • Collating, managing, accessing and using digital data securely • Receiving and responding to messages in a range of digital media • Contributing actively to digital teams and working groups • Participating in and benefiting from digital learning opportunities.	A1, A2	AT3
FEDTASK 5 Sustainable and Ethical Mindset	Students will demonstrate the ability to consider and assess the consequences and impact of ideas and actions in enacting ethical and sustainable decisions. Students will be required to display skills in: • Making informed judgments that consider the impact of devising solutions in global economic environmental and societal contexts • Committing to social responsibility as a professional and a citizen • Evaluating ethical, socially responsible and/or sustainable challenges and generating and articulating responses • Embracing lifelong, life-wide and life-deep learning to be open to diverse others • Implementing required actions to foster sustainability in their professional and personal life.	Not applicable	Not applicable

Learning Task and Assessment:

Learning Outcomes Assessed	Assessment Tasks	Assessment Type	Weighting
K1, K3, S1, S2, S3	Create a Static Visualization. This assessment task involves identifying related questions, analysing tasks to be performed and selecting the most effective visual encoding to convert data values to graphical forms.	Assignment	10 - 20%
S2, S3, A3	Students do excises by analysing data sets, comparing and selecting various visual approaches and techniques.	Completion of lab activities	20 - 30%
K1, K2, K3, S1, S2, A1, A2	Students will design and implement an interactive dashboard by analyzing real-world visual problems, selecting and analyzing related datasets, creating a design plan, and comparing and choosing proper visual marks, channels.	Assignment	30 - 50%
K1, K2, K3, S1, A3	Examinations/test will cover topics taught in the unit	Examinations/test	20 - 40%

Adopted Reference Style:

APA

Refer to the library website for more information

Fed Cite - referencing tool