Unit 17:   Business Process Support

Unit code	**A/618/7428**
Unit type	**Core**
Unit level	**5**
Credit value	**15**

Introduction

Data and information are core to any organisation and business process. Accurate data and meaningful information are of high value to an organisation and are key drivers for effective decision making and problem solving. Business intelligence relies on the use of data science, which makes use of a range of tools and methods, including data mining, data integration, data quality and data warehousing, in conjunction with other information management systems and applications.

This unit introduces students to a range of tools, techniques and technologies used for acquiring data and processing it into meaningful information that can be used to support business functions and processes.

Students will examine how data and information support business processes, the mechanisms to source and utilise data and turn it in to usable, and valuable, information output. Students will explore real-world business problems, the emergence of data science and how the application of data science can be used to support business processes. Finally, students will demonstrate practical application of data science techniques to support real-world business problems.

On successful completion of this unit, students will appreciate the importance and value of data and information in terms of optimising decision making and performance. By exploring the tools, techniques and systems that support business processes, students will be aware of the role and contribution of these technologies and methodologies, and their importance to organisations. As a result, students will develop skills such as communication literacy, critical thinking, analysis, reasoning and interpretation, which are crucial for gaining employment and developing academic competence.

Learning Outcomes

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

LO1   Discuss the use of data and information to support business processes and the value they have for an identified organisation

LO2   Discuss the implications of the use of data and information to support business processes in a real-world scenario

LO3   Explore the tools and technologies associated with data science and how it supports business processes

LO4   Demonstrate the use of data science techniques to make recommendations to support real-world business problems.

Essential Content

LO1 **Discuss the use of data and information to support business processes and the value they have for an identified organisation**

Data and information in organisations:

Value of data and information for an organisation, including decision making (strategic, tactical and operational), deliver and improve services, optimise workflow and efficiency, increase profit margins, diversification, reduce overheads.

Types of data used by organisations, including structured and unstructured data.

Impact on business processes in terms of elicitation and storage.

The importance of reliable data and impact on businesses.

Use of data and information to support business processes:

Analysing market trends to identify patterns.

Factors impacting fluctuations in supply and demand, and prices of goods.

Monitoring system performance metrics.

Monitoring and controlling the quality of a product or service.

Analysing levels of user or customer interaction and engagement.

Analysing trends in browsing and purchasing for targeted marketing purposes.

Mechanisms:

Data generation, including human generated, e.g. social media posts, documents and files, email and text messages, website content.

Machine generated data, e.g. sensor readings, log files, system performance metrics, transactional data.

Tools to collect, store, manage, analyse and display data and information, including application software, content management systems, social media platform analytics tools, databases, scripting languages.

LO2 **Discuss the implications of the use of data and information to support business processes in a real-world scenario**

Social, legal and ethical implications:

Recognise the social, ethical and professional issues related to the use of data and information to support business processes, e.g. how data and information is collected and used, use of cookies and other transactional data, sharing of data, e.g. between departments, services and organisations.

Legal and regulatory issues related to the use of data and information to support business processes in reference to current legislation and principles of good practice, as recommended by computing professional bodies.

Cybersecurity management:

Common threats to data and information, e.g. internal and external threats.

Impact of human behaviour on cyber security, e.g. how motive and opportunity combine to become a threat.

Concept of 'secure by design' when developing and using systems to handle data and information.

Ways to mitigate common threats to data and information at personal and organisational level.

Organisational implications of failing to adequately protect data and information, e.g. legal actions, financial impact, disruption of operations and reduction in productivity, damage to public image.

LO3 **Explore the tools and technologies associated with data science and how it supports business processes**

Data science overview:

Explore how the exponential growth of the amount of data generated impacts on the way data is collected and used.

The core aims of data science, including making data useful and retrievable, extracting actionable intelligence to improve business performance, automating extraction and implementation.

Key job roles, including data engineer and data scientist, and how they work with other members of a team, e.g. senior managers, business and data analysts, software engineers in change and development lifecycles.

Data-science-related skills, including mathematics and statistics, programming and scripting skills, investigation and integration of data, core business knowledge.

Sub-disciplines in the data science field, including data engineering, machine learning and artificial intelligence.

Using data:

Core data handling techniques and concepts, including input and capture, data processing and conversion, information output and security considerations.

Forms of data, including unstructured and semi-structured data, and implications on use and analysis.

Data types, e.g. date, integer, real, character, string, Boolean.

Format of source and target data files, e.g. JSON, fixed-width text file, CSV, ASCII, XML.

The use of coding and scripting languages to automate data science processes, e.g. Python, R.

Turning data into usable information, including data mining techniques to find anomalies, cluster patterns and relationships between data sets, web scraping, descriptive and predictive analysis, converting data into visual information, e.g. charts, graphs, histograms, other visual mediums.

Predictive modelling, e.g. forecasting, use of statistical models to predict and identify trends.

Communicating information effectively to a range of stakeholders.

LO4 **Demonstrate the use of data science techniques to make recommendations to support real-world business problems**

Solutions:

Supporting a business process, including techniques to elicit end user requirements, systems requirements, application to automate procedures, including when it is most appropriate to use each one.

Designing a tool, program or package that can perform a specific task to support problem solving or decision making, e.g. e-commerce function for a website to support purchase analysis, a user dashboard to investigate specific market trends, optimising delivery routes for a logistics company.

Analysing and modelling business processes using relevant techniques, standards, notation and software tools.

Design considerations:

Addressing user and system requirements, e.g. user-friendly and functional interface, considering user engagement and interaction, quality risks inherent in data, mitigate or resolve risks, meaningful data output, customisation to satisfy the user and system requirements, phases of testing of business system changes.

Learning Outcomes and Assessment Criteria

Pass	Merit	Distinction
LO1 Discuss the use of data and information to support business processes and the value they have for an identified organisation		
P1 Discuss how data and information support business processes and the value they have for organisations. **P2** Discuss how data is generated and the tools used to manipulate it to form meaningful data to support business operations.	**M1** Assess the value of data and information to individuals and organisations in relation to real-world business processes.	**D1** Evaluate the wider implications of using data and information to support business processes in an identified organisation.
LO2 Discuss the implications of the use of data and information to support business processes in a real-world scenario		
P3 Discuss the social legal and ethical implications of using data and information to support business processes. **P4** Describe common threats to data and how they can be mitigated at on a personal and organisational level.	**M2** Analyse the impact of using data and information to support business real-world business processes.	

Pass	Merit	Distinction
LO3 Explore the tools and technologies associated with data science and how it supports business processes		**D2** Evaluate the use of data science techniques against user and business requirements of an identified organisation.
P5 Discuss how tools and technologies associated with data science are used to support business processes and inform decisions.	**M3** Assess the benefits of using data science to solve problems in real-world scenarios.	
LO4 Demonstrate the use of data science techniques to make recommendations to support real-world business problems		
P6 Design a data science solution to support decision making related to a real-world problem. **P7** Implement a data science solution to support decision making related to a real-world problem.	**M4** Make justified recommendations that support decision making related to a real-world problem.	

Recommended Resources

Textbooks

Boyer, J. (2010) *Business Intelligence Strategy*. MC Press (US).

Jeston, J. and Nelis, J. (2018) *Business Process Management*. 4th Ed. Routledge.

Kolb, J. (2013) *Business Intelligence in Plain Language: A practical guide to Data Mining and Business Analytics*. CreateSpace Independent Publishing Platform.

Marr, B. (2015) *Big Data: Using SMART Big Data, Analytics and Metrics to Make Better Decisions and Improve Performance.* 1st Ed. John Wiley & Sons, Ltd.

VanderPlas, J. (2016) *Python Data Science Handbook: Tools and Techniques for Developers: Essential Tools for Working with Data*. O'Reilly.

Journals

International Journal of Business Intelligence and Data Mining

International Journal of Business Intelligence Research (IJBIR)

Web

gartner.com/en	Research and Advisory (General reference)
datascience.codata.org	Data science (Online data science journal)

Links

This unit links to the following related units:

Unit 6: Planning a Computing Project

Unit 8: Data Analytics

Unit 33: Applied Analytical Models

Unit 34: Analytical Methods.