Week One: Intro to BI

INMT5526: Business Intelligence

Semester One, 2024

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of country

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Artist: Dr Richard Barry Walley OAM

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Unit Introduction
INMT5526: Business Intelligence

Welcome to Business Intelligence

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- If you aren't enrolled or meant to be in Business Intelligence (INMT5526) then you might want to leave now before we get underway!
- My name is Tristan Reed (tristan.reed@uwa.edu.au – call me Tristan) and I will be your lecturer and unit coordinator for Business Intelligence this semester.
  - Carol Choong and Clarice Yeoh will be joining me and running some of the labs.
- Please note that you only need to attend <u>one</u> of the multiple seminars (labs) – they all have the same content and are held in the Business School.
  - Although, you are welcome to attend multiple, pending room capacity.
  - You should attend this lecture – or at least watch the recording if you can't.

What is Business Intelligence?

- Tableau (2022), a provider of business intelligence analysis and visualisation software tools suggests that it "*combines business analytics, data mining, data visualization, data tools and infrastructures and best practices to help organizations make more data-driven decisions*".

- Everyone seems to have a different definition – over time, the "generally" accepted definition has changed from "data sharing" to something similar to the above, based upon the idea of "modelling for making decisions".

Tableau. (2022). *Business Intelligence: A complete overview | Tableau*. [online]. Available from: https://www.tableau.com/learn/articles/business-intelligence.

Where it all fits

- Obviously, we only have so much time, so we can't cover everything in one unit!
  - Hence why for those in the Master of Business Analytics program, they study a bunch of other units that touch upon this definition – as may others in other degree programs!
  - You may have studied (or may study in the future) Fundamentals of Business Analytics, Programming for Business, Data Storytelling and other more specialised units.
- This unit focuses on using (computerised) tools and techniques to be able to derive insights from data and present the insights in ways that can be interpreted by others, specifically within a business context.
  - More details on what this entails are detailed in the following slide.

Content Overview

- Being a standard unit, we have twelve weeks, twelve lectures and twelve labs:
  - Week 1: Introduction to BI Concepts;
  - Weeks 2-5: Basic Databases (including data modelling and SQL);
  - Weeks 6-7: Advanced Databases (Views, Spatial, NoSQL & Graphs);
  - Weeks 8-10: BI Tools (Microsoft Power BI with R);
  - Week 11: Other Issues (Security, Ethics and Privacy);
  - Week 12: Future of Databases (plus more, maybe).
- The lectures will primarily explain the theoretical aspects and the 'how to' of the practical aspects, whereas the labs will allow you to put it into practice.
  - Hence, it is important to ensure you attend both learning activities.

Unit Overview

- As we have hinted at previously in these slides, the unit will run as a single one-hour lecture each week of semester in this room, alongside a weekly two-hour seminar (computer lab) in the Business School (with multiple choices of laboratories).
  - The lecture will be recorded and while you should attend the labs in-person, we will have plans in place in case you are unable to attend the occasional lab due to life.
- Please contact me if you have any issues or queries – such as if you are sick, contract COVID-19 or have work considerations, so we can work out alternatives.
- The LMS and Unit Outline are the source of truth – in that order – know them well!

Seminar (Lab) Format

- Each lab will allow you to undertake various practical activities which put the studies from the lecture into practice – all labs are held after the lecture (the week after).
  - It is likely easiest to use your own machine if you can, but if you don't have one or have issues with it, you can use the lab machines as these also have UniApps installed.
  - The content will vary throughout semester – sometimes it will be hand-written, sometimes it will be group discussions, sometimes (primarily) it will be computer programs utilising various software tools that you will learn how to utilise and manipulate.
  - You are of course more than welcome to come and ask questions in the labs – although it is likely easiest to save non-urgent questions until the end and there will be time for it.

Assessments

- This unit will contain three assessments:
  - Online quizzes (two of which are held throughout semester): you will have a twelve (12) hour window to complete a few short answer questions;
  - Individual assessment: this will cover the database topics that we cover throughout semester and be conducted during the lecture, held in seminars during Week 8;
  - Team assignment: this will be due in the final week (Week 12) and will primarily focus on the BI tools content. More details will be provided closer to the time.
- Please apply for extensions using the online system available here!
  - Obviously, you will have to open a copy of the lecture slides ☺

Check the Unit Outline and LMS!

- There are more details in the Unit Outline regarding the housekeeping (or logistics) of the running of this unit – both the content and assessment.
  - The most notable thing is that SparkPlus (team participation quiz system) is required for the team assessment, due in the last week of semester. **If you don't fill in SparkPlus, you won't get a mark above 50% for the team assessment.**
- LMS will be used as the main point to access all resources for the unit.
  - This includes the lecture slides, any readings, lab sheets, recordings and assessments.
- Please send me a message if you can't access LMS (lms.uwa.edu.au)!
  - This will be a big issue for other units as well if you can't access LMS at all – or you may not be enrolled properly in this unit, which could cause issues later on!

Business Intelligence Concepts
INMT5526: Business Intelligence

Analytical Hierarchy

- Analytics are often termed in a three level hierarchy (insightsoftware, 2022):
  - Descriptive: describing what happened (in the past);
  - *Diagnostic: helps explains why something happened (in the past);*
  - Predictive: predicting what is likely (could) happen (in the future);
  - Prescriptive: suggests how can we make these outcomes happen (in the future);
  - *Comparative: comparing two different things in the same way (e.g. regions).*

Insightsoftware. (2022). *Comparing Descriptive, Predictive, Prescriptive and Diagnostic Analytics - insightsoftware.* [online]. Available from: https://insightsoftware.com/blog/comparing-descriptive-predictive-prescriptive-and-diagnostic-analytics/.

Five things to know about AI (and BI)

1. **Humans are key.** You need proper recruiting to do AI (or BI) right. Not everybody who says they are good at it really is. Finding experienced developers and data scientists in AI may be your biggest challenge.

2. **The tech itself is not that expensive.** There are several open source and/ir free AI developer tools like CAFFE, TensorFlow, Microsoft Cognitive Toolkit, NLTK – the list goes on. The same goes for BI.

3. **AI (or BI) is an application, not an end in itself.** It's the addition of greater computer power and knowledge to all your data that makes it useful.

Five things to know about AI (and BI)

4. **AI is not as smart as you might fear.** It is only as good as the data you put into it. You should collect and structure your data with an eye toward AI applications. AI will be more useful if you have the proper data to train it.

5. **AI and BI isn't for every problem.** Decide what your need is and then discuss with someone you trust to decide if it really applies. Don't just fall for the buzzword.

- Yes, AI and BI need data. However, they use lots of data that isn't personal – e.g. sensors in industrial settings (IoT), weather data, shipping numbers, etc.

Business Intelligence

- BI can be used to prepare data for analysis, develop and run queries and create reports, dashboards and visualizations, with the end goal of providing results to decision makers and end users.

- There are many components of BI systems and tools, such as visuals, reports, dashboards, apps, cards, databases, datasets, dataflows, filtering and drilling.

- In time, we will also discuss Microsoft Power BI and MySQL.

Visuals (Visualisations)

- A *visualisation* is simply some way to display data.
  - Depending on the type of data and what we want to communicate, the design of the visualisation can differ.
  - We should carefully consider what is most appropriate, including aesthetic considerations such as colours.
  - Examples include graphs, tables, maps and diagrams.
  - Within BI, these form the building blocks of communications and are generally interrogatable by the user.

Reports and dashboards

- A *report* is a multi-perspective view into a single dataset, with *visualizations* that represent different findings and insights from that *dataset* - themselves gathered from different views of the *data*.
  - Can have a single visualization or many, a single page or many pages.
- A *dashboard* is a single page, often called a *canvas*, that uses *visualisations* to tell a story, consisting of multiple *reports*.
  - Because it is limited to one page, a well-designed dashboard contains only the most important elements of that story.

Datasets and dataflows

- A *dataset* is a collection of data that you *import* or *connect* to.
  - *Imported* data will 'always' be a snapshot in time;
  - *Connected* data can be updated as things change.
- *Dataflows* are processes that organise raw data into a format ready for *visualisation* (and hence *analytics*).
  - A set of queries that produce a dataset ready for visualisation.
  - Could be done in a Database Management System.

Interrogating data

- Often we will want to look at different components of our data or look at it in different ways.
  - *Drilling up* and *drilling down* refer to the ability to explore the next level of detail in a report or visual – but done first in a Database Management System.
  - *Drill through* refers to the ability to select a part of a visual and be taken to another page in the report, filtered to the data that relates to the part selected on the original page.
  - A *filter* removes data that does not apply whereas a *highlight* greys out the data that does not apply.

Computer Lab Considerations
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Setting up your computer

- It will save a lot of time, effort and pain later for us to set up our computer ready for the software and tools we will be using throughout semester.
- You will do that during the lab this upcoming week. The software will be as follows:
  - Microsoft Power BI (available only for Windows – you'll need UniApps otherwise);
  - MySQL Shell (or equivalent using Terminal on Linux and macOS – built in);
  - The R interpreter (we won't need RStudio for this unit).
- Thankfully, the University has just rolled out a new system (last week) to make life easier in this regard – named UniApps.
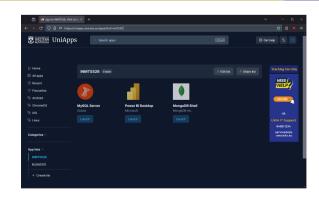

UniApps

- UniApps allows your Windows or Mac PC (or even mobile device) to download, licence and use the software required for your learning within coursework units.
  - There is a list of our software within the UniApps system linked to on LMS.
- You will need to install the UniApps software if you wish to use it on your own machine (laptop) or utilise it directly on the lab computers.
  - You are welcome to install the software directly on your own machine, however this will not have technical support provided by the unit staff or by UWA – just 'best effort';
  - The UniApps system is not perfect yet and some things may require a few goes repeated to get right – this is why we have time to work on it in the first seminar.

UniApps Interface

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Setting up UniDesk

- You will need to visit the UniApps website at https://uniapps.uwa.edu.au/;
  - You will need to log in with your UWA "Pheme" Username and Password;
  - You will need to download the UniApps application (Cloudpaging Player) and possibly a remote desktop system (VMWare Horizons) from this link – the system will tell you which ones are needed and direct you to download them;
  - You will then need to select the particular software you wish to launch – hence why we have the list or 'collection' of apps for INMT5526;
- You may be prompted for your UWA credentials *many* times and may have *many* different programs pop up and disappear.

The MySQL shell

- The MySQL Shell will allow us to interact with a MySQL database.
  - You can download the MySQL shell yourself at https://dev.mysql.com/downloads/shell/.
  - If you are on Windows, download the x64 MSI installer, run it and make sure you only select the "Workbench" and "Shell" to be installed. *If you get a popup, see the next slide.*
  - If you are using a Mac, use the "About My Mac" page (from the Apple menu) to determine if you should download the ARM (for M1 Macs) or x64 (for Intel Macs) DMG file. Run the installer within this file.
- If you are using UniApps, please ignore.

Microsoft Visual Studio Redistributable

- If you are installing MySQL on a Windows system, you may be prompted to install the "Microsoft Visual Studio Redistributable".
  - You can download it from https://docs.microsoft.com/en-us/cpp/windows/latest-supported-vc-redist?view=msvc-170.
  - You will likely need the "x64" version, but if you know you have a different processor architecture, download its version instead!
  - This goes for MySQL Shell itself – if it works, you've chosen the right one!

Connecting with the MySQL shell

- The following is for *all* users, not just those who need to install things:
  - If you are using Windows on your own machine or using UniApps, select 'Launch' under 'MySQL Server' in the list of applications in the UniApps interface.
  - If you are using Mac (other than UniApps), open up a Terminal from the Applications folder and type in 'mysqlsh' and press Enter/Return.
- Enter the command as below into the MySQL Shell and press Enter/Return:
  - `\connect test@db.tris.id.au`
- You will then be prompted for a password: this is '`test123!`' without quotes.

Connecting – with pictures!

Next week, you will use your Student ID as username and password, then change it.

Microsoft Power BI

- We won't be using PowerBI until the late part of semester, however you may want to install it on your own machine, if you are not using UniApps.
  - If you wish to install it on your own Windows machine, install "Power BI Desktop" from the Microsoft Store - Mac users will have to use UniApps (as it only runs on Windows!)
- Once installed, all should open it up from the Start Menu.
  - You can ignore the window that may appear asking you to sign up or in by clicking 'X'.

Power BI – with pictures!

Press the "X" to remove the trial nag, if it appears!

Downloading the R interpreter

- If you have installed R and RStudio for another unit, or are using a lab machine or UniApps, then there is nothing you need to do. If you need to install R:
  - We only need the R Interpreter from https://cran.r-project.org/bin/windows/base/ ("Download R-4.2.1 for Windows), not RStudio as well.
  - Once installed, we can leave it be for now.
- As this will be used only for Power BI, Mac users do not need to install this.

Questions and Answers

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