

Developing Data Analytics Processes to Inform and Enhance Learning

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Abstract:

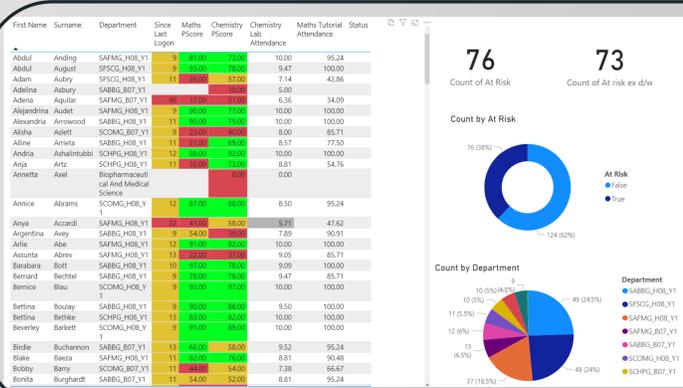
This project explores the use of data from a variety of potential sources to create an accurate picture of student engagement. In this poster, we examine the use of this data and how its secure presentation to the relevant parties has been developed. Having completed market research for available solutions we found significant short comings in current service offerings. The project, as a result, has focused on capacity building within the organisation in order to be able to create bespoke analytics processes which offer significant, correct, reliable and appropriate data. We report the development of a data pipeline - harnessing data from Moodle and other sources, storing and transforming the data for presentation in dashboard format. We also explore the concept of alert/notifications systems and development of criteria for assessing student engagement.

Market Research:

Our first action within this project was to conduct market research and evaluate commercial offerings for developing analytics. All commercial offerings were found to have a number of serious shortcomings which meant they were unsuitable for use in our Higher Education setting.

- 1) There were serious data accuracy issues – experiments were conducted to evaluate data recorded vs actual engagement measured in a controlled environment and large discrepancies were noted.
- 2) The ability to deliver flexibility in the data pipeline was absent which limits scalability and prevents bringing onstream additional data sources without significant extra cost.
- 3) The solutions are all black box in nature meaning that there is no direct oversight of the data processing.

Analytics for Student Success:



Dashboards were developed using Power BI to create class overviews.

Criteria based evaluation of student engagement data highlighted students who may benefit from additional support/intervention in a timely manner. Promotion of Student Success is core to the project.

Capacity Building:



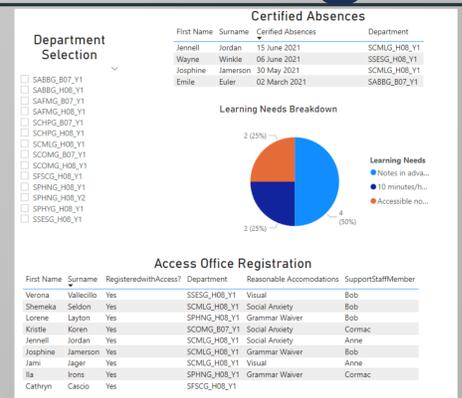
In order to facilitate the project it was necessary to build the required skills base within GMIT. Working with Microsoft, and their training partner Spanish Point it has been possible to develop skills in data extraction, transformation and presentation. Team members also include Computing Services staff who also underwent training.



Controlled Data Sharing:

Dashboards can be used to replace traditional methods of sharing such as Excel sheets. This means that selected data about students can be shared to a select audience with appropriate permissions.

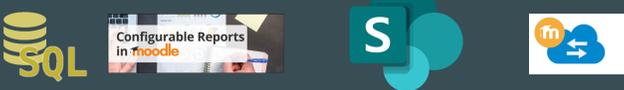
As seen here, a single point of reference can exist for lecturers for student information without need for other users to have access to combined data.



Data Pipeline Design:

Data extraction is a bottleneck in all data analytics projects. To create the data pipeline, exploratory investigations were carried out with:

- 1) Data from Moodle using configurable reports plugin in Moodle
- 2) Data from manual input sources
- 3) Other data sources

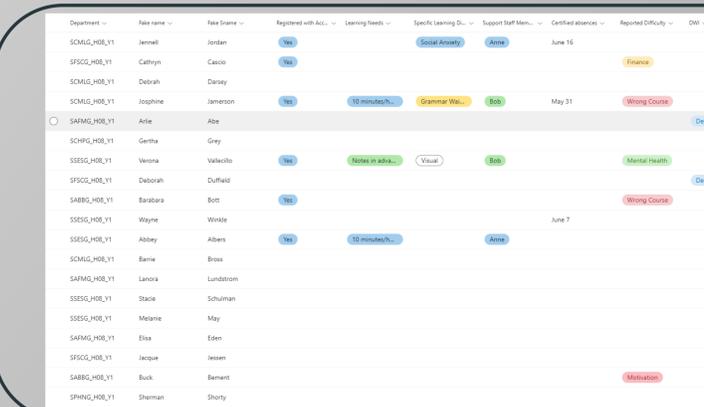


Having identified and validated the required data, configurable reports was replaced with a RESTful API to allow for scalability of the project.

Data security is also paramount for this project and through the use of single sign on managed services using two factor authentication an appropriate level of data security can be maintained. Significant advantages also arise where this system replaces more traditional data sharing methods:

- 1) Data is up to date.
- 2) Version history and copying issues are avoided.
- 3) Access can be assigned and revoked through SSO credentials as appropriate.
- 4) Reporting on the data can be completed more easily.

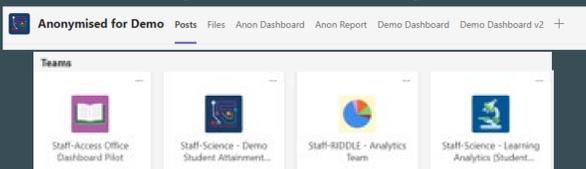
SharePoint lists:



SharePoint Lists are a very effective way of combining manual input data from different sources. They can be dynamically prepopulated with the appropriate student information. In addition, access is secure and can be revoked, increasing security compared to traditional methods.

Presentation:

Microsoft Teams can be used to contain programme teams or other groups of people who require access to information on a particular student cohort. They can be used as secure portals for data access.



Planned Data Flows:

In our current model for data management, different data sources are contained within relevant teams for those who require full access. Each team has its own dashboard showing relevant data. In addition reports can be generated from these dashboards to fulfil required reporting functions. Automatically triggered notifications are also possible.

SharePoint lists which are fully accessible from one team may be used to provide limited and non-editable reports into another dashboard. This provides an inherently up to date and secure means of communication between staff to inform and enhance learners experiences.

