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Building a 'Super System' for Student Planning + Income Modelling

Introduction

One of the UK's largest universities and research institutes, the University of Nottingham is ranked in the top 20 of several major UK league tables and listed in the top 100 universities worldwide. It boasts novelist D. H. Lawrence among glittering alumni and is responsible for many ground-breaking inventions including the MRI scanner.

About 45,000 students from around the world are spread across multiple campuses in Nottingham and in Malaysia and China. With strong links to other universities and companies worldwide, Nottingham offers over 800 courses covering everything from medicine, science and engineering to social sciences and the arts.
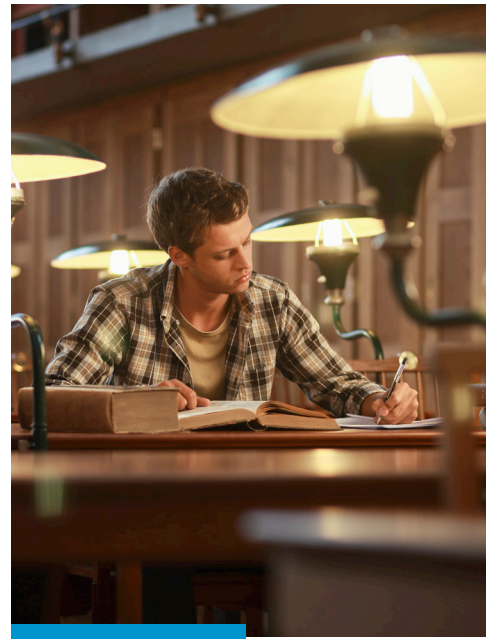
The State of Play

Student income is the largest income stream for the University of Nottingham, and each year the university must forecast its student population and the related income in order to allocate departmental budgets. The planning and performance team is responsible for collecting and analysing up to nine million records of data on thousands of students across the globe to model expected student numbers and activity accurately.

However, with 56 departments requiring deep levels of analytical granularity and five-year forecasts, calculations are complex. By 2015, the team desperately needed a more dynamic student planning model that would allow increased granularity and subsequently improve decision making, whilst working alongside Tableau's data visualisation. The task would be to handle all reporting for student planning and forecasting as well as verifying data for HESA (Higher Education Statistics Agency), the body that collects quantitative data about higher education in the UK.

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The team had earlier replaced Microsoft Excel with IBM Cognos planning and business intelligence software to cope with scalability needs but keeping the data warehouse relevant was difficult and expensive. Utilising Tableau was relieving some limitations but querying and data preparation were still problematic.

"That's when Alteryx came along and changed everything," says Neil Davidson, Head of Student Reporting and Analytics, University of Nottingham.

Why Alteryx?

Davidson's team initially took advantage of Alteryx to clean and prepare the data for Tableau by completely scrapping the student elements of the data warehouse and rebuilding a new dataset in Alteryx, comprising 10 years of student data.

"Coding wasn't required so we were able to build the system ourselves," Davidson says. "Within two weeks we had a proof of concept and Alteryx was handling the volume with ease. So, we kept developing and within two months we'd built an entire student number planning and income model. There was excitement within the team because using the product had opened the door to many new and exciting possibilities. In addition to our student number planning model, we have managed to recreate our data warehouse from scratch, as well as beginning to leverage data on applicants' A-level grades to model which students we want to actively recruit."

The Solution

Today, all analysis and forecasting for student planning and funding is performed through Alteryx. Broken down into 56 budget units, the university's departments all want to understand how the 15 different income streams come in. Add 24 student types, all the courses offered and there are over eight billion cells to be modelled.

Drilling into the student history reveals current, returning and new student numbers, what they'll study and expected income from fees and other funding. The team then adds more complex querying to provide deeper insights, such as who's full- or part-time, undergraduate, postgraduate or postgraduate-research, which students are domestic and overseas, who is joining partway through courses and so on. Once the cycle is complete, the results are transferred to Tableau for checking before reports are distributed to university departments or data is submitted to HESA.

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Planning models are now produced in 9-10 minutes instead of 4-5 hours Storing a full history makes reporting easier and faster than before.

Multiple iterations are running simultaneously, compared to just one at a time Version control allows results to be compared with historical data.

Colour-coding and annotating macros keep things organised And allow colleagues to immediately understand what's happening, even those new to higher education.

"My phone's constantly ringing off the hook with people wanting to talk about student planning," Davidson says. "My colleagues are happy to solve their problems in Alteryx. They are continuously finding new and exciting ways to work with the data, which is giving everyone a real sense of achievement."

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