

## **Title**

The evolution of SUnBIRD: a business intelligence timeline

## **Introduction**

This paper provides a timeline of Business Intelligence at the University of Strathclyde between June 2011 and June 2018. It's a chronological overview focussing on the successes, highlighting some of the obstacles along the way, and how we overcame them. And at the end I will try and identify some of the success factors which I think can be applied to all Higher Education BI Developments.

## **Overview**

The story began as the Corporate Management Information (CMI) Project. A colleague was hired in IT and I was hired the Planning Team to deliver the Project; the main objective was to 'deliver a datamart every 3-4 months' and gradually build a data warehouse based on specific business functions.

In June 2013 the project evolved into what we now know as the SUnBIRD Project. By that time we were under new leadership brought in to deliver a step change in Management Reporting, and since May 2016 the Project has evolved into Business As Usual.

Within months it became clear that the pre-existing project structure wasn't working and I was asked to take on the role of Project Manager so the business could take the lead and IT colleagues could focus on developing the data warehouse.

## **Business Decisions**

It also became apparent very quickly that to deliver any datamart, from requirements gathering to final sign off would take at least 5 months if we were to allow enough time to arrange meetings with stakeholders and respond to their feedback. So the only way to achieve a delivery rate of 3-4 months would be to stagger the development of datamarts.

As the University didn't have dedicated BI tools nor processes in place to address that, we decided to use a combination of tools that were available to us. We considered Business Objects, but found it not very user friendly and therefore decided to develop something ourselves using Oracle Application Express and a plugin to present charts and graphs.

## **CMI Project**

The first Datamart was the Research Grants and Contracts Datamart but this turned out to be not as simple as was expected. As the data had been used for a pre-project trial it was deemed to already have been cleansed; it wasn't. Research colleagues had a great understanding of what their data should look like, but not of the business' reporting needs. There was also great concern about how data might be interpreted and therefore we were asked to present figures cumulative by quarter so graphs would always go upwards and look positive. This was 2011.

Within a year we delivered our first datamart on Research Grants and Contracts to approximately 40 users, followed soon after by an update to include information from the Finance system, whilst also working on the next datamart on Tuition Fee Income. The functionality was limited to simple analytical functions and without the additional data from Finance the picture was incomplete, but it was a major breakthrough as it was the first time senior management in the University had seen this information available in this format.

The application was described as 'clunky', but we had proven to understand what the business wanted or needed. We were asked to present a progress report to Executive Team (ET) to create an interest in the following phases of the project.

It was a period of major change in the University: the Head of Planning left and a new Director of Strategy & Policy was brought in to make a step change in Management Reporting.

At the same time a programme was underway in the University to improve Project Management within the University. This resulted in a structure based around Prince 2 that allowed us to submit project proposals, changes to existing projects, and apply for funding.

The day before our proposal was sent to Executive Team we managed to release the Student Diversity & Equality datamart. This helped secure our bid as it was fresh in decision makers' minds that we were delivering new datamarts, but it also highlighted the need for a Business Intelligence tool as our clunky prototype was really struggling with large datasets. Since our hand-stitched approach was deemed 'clunky', we analysed toolsets and decided on Qlikview as the preferred tool and used the University's strategic partnership with Capita to purchase Qlikview.

### **SUnBIRD Project**

We attended a User Day where other Universities were showcasing how they were using Qlikview. There was a great variety of applications and we realised that some Universities were far ahead of us having used Qlikview for several years. But it also highlighted some issues they were facing after several years of Qlikview development: a lack of unity between the different documents: one University showcased 3 documents they'd produced in Qlikview but they might as well have been from 3 different Universities. It highlighted the need for branding in trying to achieve a single trusted source of the truth. Not just in name, but by using an agreed template for all datamarts to follow. We also recognised the need for dashboards with ready-made information aimed at senior management, and more analytical functionality for those with more time to invest.

We had managed to hire an additional front end developer who was keen to learn Qlikview, booked 2 days training and started to develop our template. Qlikview was a great success. Okay, the data was already in the data warehouse but the template was designed, the Research Datamart migrated and Dashboards developed; all in under 2 months. We therefore decided to add more functionality before release: there was a void between Dashboards and Analysis which could be filled with off-the-shelf Reports.

The SUnBIRD system was launched in December 2013. It contained the newly developed Research Grants and Contracts datamart. We embarked on a roll out programme of demonstrations and user training across the University to increase the user base, and within months we earned back the entire investment as it became apparent during one of the demonstrations that Research Applications and Awards in the Science Faculty were falling far behind in comparison to previous years. This would result in a reduction in Research Income for years to come and would previously not have been noticed until after year-end. Corrective action could be taken in-year because SUnBIRD enabled early detection.

The Tuition Fee Income datamart was released in March 2014 using the same template as the Research datamart. Unfortunately we had to hardcode our expressions into Qlikview. Our preference would have been to store expressions in a source table for easy maintenance and to be able to re-use them. As a result the templates for each datamart would slowly start to drift apart over time as datamart-specific functionality was added into each datamart.

We continued to work on a revamp of the Diversity and Equality datamart which would result in a wider 'Student Profile' datamart. To ensure we reported the most important statistics on the dashboards and had buy-in from across the Institution we established a new Project Board with representatives from Student Experience and Enhancement Services (SEES), all 4 Faculties, Senior Management, and Strategy & Policy.

The new Project Board helped us define our student related Data and Population definitions: we created a Standard Population that is used for the overwhelming majority of our reports. This basically includes our own active students, but users no longer have to apply 15 different selections to try and replicate this. For reporting on different student cohorts we created the option to switch to the Total Population and again to make our end users' lives easier, we created Special Interest Groups. Just like with the Standard Population this removes the need for end users to know and correctly apply a multitude of selections.

But not long after that half our team left: the additional 2 Qlikview and Data Warehouse Developers we'd hired were looking for more security than the temporary contracts we were able to offer. Thanks to the success of the first 2 SUnBIRD releases, the considerable list of additional datamarts we would like to add, and the awareness of senior management that we had lost staff on short term contracts, we had built up the confidence to bid for permanent resources and enough clout to be successful in our bid. By November 2014 our team was back up to full strength and again able to work on multiple datamarts at the same time.

In February 2015 the Student Profile datamart was released and from then onwards the University was able to answer questions around Student Headcounts and FTEs within seconds. Something that previously had cost a considerable amount of time, had been prone to human error, and confusion as to which students should be included or excluded.

In our SUnBIRD demonstrations and when answering queries about SUnBIRD we found out that researchers felt it was unfair that they'd been asked to get involved and cooperate on other research projects but didn't see the benefits back in the BI reports, unless they were Principle Investigator. All Applications, Awards and Income to date had been attributed to the Principle Investigator. So we released another major update to the Research Datamart while we developed the Student Retention, Progression and Outcomes datamart which was released in January 2016.

Despite our best efforts to present a complete BI Solution in SUnBIRD users continue to export data into Excel and present it in their own way. Often it's because they want to have their own copy to store and compare over time, or they want to print a paper based version so they can scribble notes. But we also received requests from users wanting to use the charts in PowerPoint presentations and often had to direct them to use the Windows Snipping Tool. In December 2015 we therefore decided to purchase NPrinting, an add-on that allows reports from Qlikview to be auto-generated and emailed or stored for users to collect, in various formats: Excel, Word, PDF, PowerPoint or HTML.

### **SUnBIRD Service**

In May 2016 we closed the Project down and continued as a Service. Although we had started work on the Staff Datamart, this was not seen as a priority and has therefore still not been released. Adding Staff Data will allow us to develop additional measures in existing datamarts, like Student:Staff ratios and relating Research Income to Department sizes. But until that time we aim to maximise the value of existing information in SUnBIRD.

In December 2016 we released the Key Performance Indicators Dashboard. This is a slightly different datamart compared to existing datamarts as it displays the University's 16 KPIs in a single overview. The KPIs have been agreed with Faculties and Departments in line with the University's Performance Measurement Framework and Outcome Agreements with the Scottish Funding Council, and the data for 6 of the KPIs are loaded directly from the Student Datamarts. The other KPIs are still compiled by various Departments in the University, collated twice a year by Strategy & Policy in a spreadsheet that is then loaded into Qlikview.

In 2017 we finally created our first NPrinting Reports and released several bug-fixes in SUnBIRD that had crept in during the development of Student Datamarts. We combined these releases with additional reports and functionality to help divert the focus away from the negative aspects of having reported incorrect figures and show SUnBIRD in the most positive light. This may seem trivial but it does help in maintaining confidence in a system that's meant to represent the single trusted source of the truth.

At the same time we had started to overhaul the existing template because I was starting to feel that SUnBIRD could do with a facelift. As the main developer on the original version of SUnBIRD I have spent more time than any user staring at the screens and if I was getting tired of the look and feel after 3 years, then soon other frequent users might too. We had learned a lot about what works and doesn't work well for users, learned new Qlikview development skills that we wanted to apply and bring it back to using one template that can actually be used for all our datamarts.

The new template is capable of loading any of our existing datamarts by changing 3 variables in the load script, and the document title. All measures, dimensions and variables are loaded from a single Excel workbook per datamart. This will allow us to develop new datamarts and functionality at a higher pace, especially if the data is already available in the data warehouse. We released SUnBIRD 2.0 for user acceptance testing in April and received an enormous amount of feedback. It was the first time we've re-tested all datamarts at once so we were quite overwhelmed by the amount of feedback. We're currently working our way through the main issues and are aiming to release SUnBIRD 2.0 at the end of June. This will be followed by the Staff/HR Datamart over the summer.

### **SUnBIRD Releases**

All of this has resulted in the following release pattern, which kind of surprised me. I hadn't seen this or noticed any pattern until I put together this presentation. What we've tried to do from the start was deliver a datamart every 3-4 months. One of the main reasons behind that was to ensure we were always seen to be delivering something. The biggest gaps have been less than a year. And where it did take that long we've been able to explain why it was taking longer: it took longer to extract, transform, load and cleanse all student related data, we had staff departures to deal with, and where we have foreseen gaps between deliverables, we've managed to use Qlikview to create other applications that run alongside SUnBIRD: in April 2016 we released a Student Applications Tracker (STATs) and in April 2018 we released SID (Sector Information Dashboards).

### **Success Factors**

So what have been our critical success factors for you to take away?

#### 1. Vision

Know what you want to achieve, what Business Intelligence means to you and your organisation. What are the main obstacles and challenges? For us it was a lack of agreement over which figures were right. As a result each question was answered with 3 questions back, no straight answers and

failure to make decisions. For us the solution was first and foremost about clear Data Definitions. But we also recognised the value of having a brand, a name they can trust and making sure that every step in the process is about building and maintaining the trust in that brand.

## 2. Backing by Senior Management

It will lead to buy in by the whole organisation. Without the Principal, Vice-principals and Deans mentioning that they had seen certain figures in SUnBIRD it would never have been so successful. We now have more than 750 users and we couldn't have done that without them. Because they were using it, Research Directors wanted to know what was in SUnBIRD, their Investigators wanted to use it, etc. I was at a conference in Barcelona last month with other Universities that use Qlikview and the closest to our number of users was a Spanish University with 400 end users, other UK University there had less than half of our user base, and most of them have had Qlikview longer than we have.

## 3. Resources

Make sure you get the right Tools. We use Qlikview, there are other products out there, but it's important that they can deliver what you need. Just as importantly: get the right people. Not just the Project Manager and Developers, but the right Data Custodians, people who can resolve data issues in source systems. Systems representatives who know the ins and outs of their systems. Make sure they supply you with the right data. And make sure that both IT and the business are well represented and work together. All too often I hear from other Universities that IT don't want to give them access to the data they need or IT don't understand what the business wants to report on. Our BI Project was a joint project and that worked really well. I still have 2 desks: in the mornings I'm with the developers in IT, in the afternoon I work in the Planning Team in Strategy Policy. And finally make sure that everyone has time for BI. Time to specify requirements, time to test deliverables and provide feedback; time to train and be trained on whatever solution you deliver, and time to listen and respond to feedback and end user queries.

## 4. Regularly Deliver Value For Money

To get all the above in place requires investment and that requires a return. If you don't deliver returns on investments people will question what they invested in, stop investing in your project or service, or at best forget about you. Each datamart has delivered new value, some more than others, but there's also added value in data quality improvements, additional functionality – bells and whistles. Every release has ensured we remained relevant. Don't wait until everything is perfect or for users to tell you what they want. Provide a prototype that users can comment on and make it available to the right group of stakeholders. It's much easier for users to comment on something real than to conceptualise and describe what they want out of thin air.