

Transforming data into insight

This article focuses on a new approach to using quantitative data being trialled at Library Services, Liverpool John Moores University. By employing business intelligence software to interrogate, combine and analyse a variety of data sources, data is transformed to provide insight into customer needs and preferences, which will better inform services.

This case study will help librarians looking to extract more meaning from their data by outlining the different stages that this data needs to go through to transform into insight. This framework is especially suited to environments where the volume of data available to practitioners can prove daunting.

Introduction

Librarians love data. Many institutions gather statistics on every aspect of their services, from number of people through the doors, to individual clicks on websites or article downloads. And yet, the sheer volume of data that these statistics generate presents an awesome challenge to managers and practitioners; how to combine and analyse this data in a way that generates meaningful insight on which to base decisions.

Library Services, Liverpool John Moores University (LJMU) faced this same issue and in 2016 identified as a key strategic aim the development of its information/data to usefully inform decision making. As a result, we have spent the past few months developing our business intelligence systems in order to deliver insight into customer preferences and behaviours to better inform our services.



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Background and rationale

Library Services at LJMU provides a varied array of services to over 25,000 staff and students as well as many external partners. The department has responsibility for acquiring, curating and supplying learning materials for a diverse student body studying a wide range of subjects. In order to meet the needs of its many customers, we maintain a wide range of different services, including space provision, maintaining significant print and electronic collections, enquiry services and delivering skills sessions.

The service has a strong emphasis on delivering a quality experience to its customers. Quality in this context is taken to be the 'ability to meet or even exceed the needs of its customers'.¹ Yet within this statement is the implicit assumption that the department has effective mechanisms for understanding its customers in order to ascertain their needs and judge how well they are met by the service. This, therefore, is inextricably linked with the department's marketing activities. Although many definitions of the term 'marketing' are available, for the purposes of this case study, and indeed this project, marketing has been defined to be the process by which we understand and communicate with our customers.

'Quality ... is taken to be the "ability to meet or even exceed the needs of its customers"'

Recent improvements have been made to the collection and analysis of qualitative data, including changing the timings and location of library drop-in sessions, which has dramatically improved attendance levels. Similarly, the service has developed effective ethnographic study methodologies to gather more in-depth insight into customer perceptions and attitudes towards aspects of the service.

72 The quantitative data, on the other hand, was identified as less effective when it came to developing customer insight. This was due to several factors:

- lack of joined-up approach when considering the data
- absence of appropriate frames of reference to make the data more meaningful
- lack of availability of data (particularly in relation to e-resources).

As a result, a small project team set out to establish a framework for organizing, structuring and considering quantitative data in such a way as to make it more meaningful for managers. The team consisted of the Associate Director, two Library Managers and the Team Leader for Business Control, who has oversight of the management information for the service.

In order to make better sense of its data, the team drew inspiration from Smith and Raspin's data to insight wheel² which suggests that data goes through an iterative process to deliver value, with stages including information, knowledge, insight and changes, before finally providing value (or quality, in this context).

An exposition of how Library Services, LJMU has approached each of these stages will now form the basis of this case study.

Data

Library Services, LJMU, in common with many academic libraries, currently collates a wide array of usage data relating to buildings, resources and user interactions. Yet the sheer volume of this data presents a daunting challenge: how best to combine the data to create insight into customer behaviours and preferences. This includes primary data – i.e. data collated by the library itself – and secondary data – collated by agencies external to the library, including student information data and the SCOUNL (Society of College, National and University Libraries) data set.

'the sheer volume of ... data presents a daunting challenge'

The first stage in the data-driven marketing project was therefore to make a catalogue of all the existing library data sources. This involved significant consultation with other managers in order to ensure that the catalogue was fully comprehensive.

The end result produced a list of over 30 different data sources. These were categorized into type of indicator (e.g. transactional, feedback, etc.) and their current reporting frequencies were noted.

This catalogue was then used as the basis of creating a new marketing information report.

Information

One of the biggest initial challenges was to scope the desired outcome appropriately. The danger of this kind of project is its potentially endless remit. The vast array of data collated by most academic libraries has an almost infinite potential for investigations and analysis. The project team was therefore adamant that it must define an achievable brief at the outset, and adhere to it.

'The danger of this kind of project is its potentially endless remit'

Following discussions with pertinent stakeholders, it was decided that, initially, the audience for reports would be the service Management Team (MT), who have operational responsibility for the department.

Having determined the audience for the report, the next stage was to consider what to include in the report. This was done by carrying out a marketing needs analysis with the existing MT in order to ascertain their preferences.

73 This analysis was carried out via a focus group run during one MT meeting. In order to get participants to consider the customer perspective, comments from the previous National Student Survey were circulated in advance.

Participants were asked to answer seven questions as part of the focus group. These were:

1. Looking at the NSS comments, what are the most important aspects of our service to our customers?
2. Which of our existing performance measures/stats relate to these service areas?
3. What services do we provide that weren't mentioned in the NSS comments?
4. Which of our existing performance measures/stats relate to these service areas?
5. What is the existing data not telling us?
6. Thinking with your MT hat on, and in light of the previous discussion, identify the five most significant performance measures.
7. Of those measures, what is an appropriate reporting period, and frame of reference?

These findings were then transcribed and analysed by the project team. The main findings from this activity were that managers wanted to know primarily about three areas:

- *building usage* (including measures of busyness and occupancy levels of both study spaces and PCs)
- *collections usage* (both print and electronic, including both searches and downloads)
- *user services* (enquiries received and fulfilled through various media; satisfaction and uptake of skills delivery sessions).

These three areas were then used as the basis on which to build data reports to elevate this information into knowledge.

Knowledge

Smith and Raspin suggest that information becomes knowledge when it is 'synthesised and contextualised with other information'.³ This relates to one of the issues identified earlier, which was that data tended to be considered in isolation. To address this, we decided to employ a business intelligence approach, defined to be, '...the set of strategies, processes, applications, data, technologies and technical architectures which are used by enterprises to support the collection, data analysis, presentation and dissemination of business information'.⁴

In order to transform this information into knowledge, a business intelligence software package, Microsoft Power BI, was used to create live, interactive data visualization reports. This was a new programme to many and therefore training was required, which was delivered by the University's IT Services department, who also helped develop several reports.

The sheer amount of data that we had was really quite overwhelming and therefore, to help direct our thinking, we found it to be extremely useful to articulate one or two research questions that we wanted the data to provide the answer to. For example, when it came to considering building use, we wanted to know how busy the library buildings are, and why.

This question led us to consider what we mean by the term busy. This had two meanings in our view; one was what percentage of the student body was actually walking through our doors in a given period of time, and the second definition looked at concurrent occupancy levels. From our qualitative feedback, we already knew that library occupancy was a key issue for students. Therefore, concurrent

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74 usage was just as important an area for consideration as total usage numbers.

There were two major lessons learned during this process. The first consisted of the need to think through what exactly one is seeking to demonstrate as part of this process. This includes considering what the most effective visualization would be and what is the best frame of reference by which to consider the information in order to create knowledge. In some cases this will be historic performance; in others, number of unique users (expressed as a percentage of all potential users) may be more insightful. In practice, some of this was discovered through trial and error, although it did become easier with experience.

Secondly, some of the data itself required a lot of work to get it into the correct format for Power BI to successfully interrogate. This was extremely laborious and time-consuming, and imitators of this approach would be well advised to consider making changes to existing data collection methods in order to limit the requirement for this.

Insight

Insight is a difficult concept to quantify as in many ways it is only apparent with hindsight. However, in this case, the project team have defined insight as *knowledge that leads to meaningful and impactful change*.

LJMU Library Services are still relatively near the beginning of this process so it is hard to cite many insights deriving from this work at the time of writing. However, by structuring and considering our data differently, it has been possible to identify areas for further investigation and change.

One such example came about as part of a routine analysis of the SCONUL data set (a national data collection exercise carried out annually amongst UK Higher Education providers). Previous comparison work has used data tables and some basic derived indicators to consider how LJMU compares to similar institutions. However, by using a radar chart visualization to compare several institutions for derived indicators simultaneously, how the department compared to similar institutions became much more easily understood. This enabled managers to identify areas for development and/or improvement, which are currently ongoing.

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LJMU has not yet undertaken the final two stages of this process, changes and value, although some initial changes have been identified and their impact will be evaluated in due course.

Benefits of this approach

LJMU believes that using business intelligence systems has been a very worthwhile activity. The main benefits have been:

- Visually presenting data makes it much more appealing and comprehensible to audiences who may not be comfortable interpreting numbers. Intelligently applied, visuals tell a much more engaging story than bare numbers.
- Where available, business intelligence software can interrogate live data sources, thus ensuring completely up-to-date information and eliminating potential error that comes with human data input, as well as freeing up staff resource for other tasks.
- Using business intelligence software makes linking findings from different data sources easier. This allows for a more holistic approach when considering business performance. For example, should the data show a decrease in physical loans, but an increase in e-book usage then this could suggest an increasing preference for electronic media, which may influence the allocation of resources.
- Establishment of a robust evidence base on which to make decisions or request additional resources from external sources.

75 These benefits are invaluable to busy managers who rely on this kind of information to base their decisions on. The more accurate, up-to-date and comprehensible the information, the better the quality of the decision making.

Challenges and limitations

During this process several limitations were experienced. These included:

- Identifying frames of reference that are appropriate and meaningful. For some measures comparison with historic performance provides a meaningful context. For others, it might be number of unique users expressed as a percentage of total number of potential users.
- Selecting appropriate visualizations that promote meaning. There are a lot of different visualizations available using BI software, which presents a challenge in selecting one which best communicates meaning from the data.
- Transforming data into the appropriate format for interrogation by the business intelligence software. At times this has proved time-consuming and laborious.
- Availability/quality of data continues to present a challenge. Data maintained in the data warehouse was relatively straightforward to interrogate. However, other data was generally in less good condition. Further to that, some data is simply not available, at least not to the desired level of detail. This is particularly the case for e-resources.
- This is not a quick process. Establishing the data visualization has taken several months and subsequent projects to investigate and address issues highlighted by this approach are still in their infancy. The true impact of this work is still to be assessed.
- The benefits of this approach mainly apply to those service areas which are suited to assessment by quantitative metrics. However, libraries will have service areas for which collecting quantitative data is not well suited to evaluation, such as skills delivery.

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Future developments

We are still in the early stages of developing this approach to considering data, which is still in its infancy within the Library profession. The project team have identified the following next steps for developing our data infrastructure:

- Finish and roll out a regular reporting mechanism for considering holistic activity data in order to gauge service performance at a management level.
- Develop reporting methods for different service areas which contain more detail, specific to that business function.
- Improve data collection methods so as to reduce the amount of work required to make data compatible with the business intelligence software.
- Improve data availability, in particular concerning e-resource usage and customer demographic data so as to better understand who is and, just as importantly, who is not using the library.
- Find a mechanism to jointly consider qualitative and quantitative data sources. The two need to work in tandem to provide true insight. Quantitative data can often suggest 'what' needs to be done; however, the qualitative data will supply the 'how' and 'why'.

'ensure that departmental strategy focuses on those developments which best suit customer needs and preferences'

Concurrent to these developments, a list of projects and investigations based on the information and insight generated by the approach described above has been identified and is being added to. The purpose of this approach is to ensure

76 that departmental strategy focuses on those developments which best suit customer needs and preferences, identified by a more innovative presentation and interpretation of data.

Conclusion

This project was driven primarily by a desire to improve quality by providing services that best match customer needs. By structuring and combining customer data in such a way as to provide insight into how they are interacting with the service, and how these trends are changing over time, the service is gaining knowledge about how best to direct its resources, and where to direct its strategy.

These quantitative insights, used in conjunction with qualitative perceptions, help keep customer needs, preferences and requirements at the forefront of managers' minds when planning and decision making, helping to ensure that quality remains at the heart of all of our services.

We at LJMU are still exploring the powerful potential of using business intelligence software to develop market insight into our customers. Our progress to date has been encouraging and well received by stakeholders and peers. Presenting data visually and layering different data sources together has made it easier for managers to identify areas for development and allocate resources, in order to better understand customer behaviours and preferences and plan services accordingly.

'a better culture of data-led decision making, hopefully to the benefit of all our customers'

By better structuring, organizing and analysing our data as a whole, we feel more confident in assessing our overall performance, thus leading to a better culture of data-led decision making, hopefully to the benefit of all our customers.

Abbreviations and Acronyms

A list of the abbreviations and acronyms used in this and other *Insights* articles can be accessed here – click on the URL below and then select the 'Abbreviations and Acronyms' link at the top of the page it directs you to: <http://www.uksg.org/publications#aa>

Competing interests

The author has declared no competing interests.

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