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Making data relevant to business

Modern analytics can increase the efficiency of business learning through systematic experimentation

WHEN Singapore Management University (SMU) undergraduates started the current academic year in August, they could choose a new subject as their second major: analytics.

This prepares them for widely sought-after jobs and professional roles. They can pick up skills in processing, managing, analysing and making sense of large amounts of data, in addition to pursuing their bachelors in one of the core SMU disciplines of business, accountancy, economics, social sciences, law and information systems.

Companies are paying attention not just to potential hires from SMU in analytics, but to the possibilities that emerge from educational and research project collaborations, as SMU is widely regarded as standing at the cutting edge of research efforts in the area of analytics for business, consumer and social insights.

For example, through their Living Analytics Research Centre, a five-year research partnership with Carnegie Mellon University, they are working on consumer and social analytics projects with Citibank, StarHub, Resorts World Sentosa, Sentosa Island and Buzz City, collaboratively working towards a new approach to analytics that is experiment-based, closed-loop and iterative, and network-centric. Through their LiveLabs Urban Lifestyle Innovation Platform, they are developing new approaches to mobile sensing and analytics that enable next generation 'context-aware' analytics for consumer and social insights in projects with CapitaMalls Asia, Changi Airport Group and SMU students.

Professor Steven Miller, founding dean of SMU's School of Information Systems (SIS) and the university's vice provost of research, said "Very few places in the world can bring together strong academic research capability with industry projects, application-oriented research, and government funding for analytics at this scale, this depth, and this speed in the way that Singapore is doing. Our ability to coordinate across the private sector, government, university and national research institutes has enabled us to move quickly in this rapidly evolving area, and is also helping to get more people trained through their participation in joint industry-university projects."

The data explosion

In the last 10 years, technological developments, combined with social trends such as user-generated content, smartphone usage, and widespread participation in online social network communities, have caused an explosion of demand for trained analytics professionals. Companies now try to gain a competitive edge using what is known as 'Big Data'.

Big Data connotes the massive increase in the scale and diversification of data generated, as well as data collected and analysed. Data is now being generated and collected in huge volumes, at high speeds, and in all kinds of varieties – not only numbers, but also text, emails, SMS messages, photos, videos, etc. While it has become dramatically cheaper to collect and process data on a per unit basis, companies are finding they need more and more people to work in the 'data value chain' – organising and managing data, analysing data, interpreting outputs, and communicating conclusions to an ever expanding number of people inside and outside the organisation. As a result, business spending and investments related to Analytics are increasing rapidly even with the corresponding reduction in per unit cost of doing this type of work.

"Sophisticated analytics is getting more embedded into the everyday transaction processing for accounting and finance, risk management, compliance, procurement, operations and supply chain, and sales and marketing. The number of people involved in creating analytics output and the number of people using these output have vastly expanded. Analytics has now gone mainstream," said Prof Miller.

Plenty of job opportunities are being created. SMU's own Bachelor of Science in Information Systems Management, or BSc (ISM), has grown from an initial intake of 93 students in August 2003 to a current annual intake of 280 students, resulting in more than 1,100 students enrolled in the programme today. "In addition to the specialised courses where we teach data and decision analytics, we also inject analytics-related thinking and content into nearly all of our information systems courses," Prof Miller explained.

Under the BSc (ISM), information systems applications and analytics methods are deeply integrated with real-world business scenarios, management issues and decision-making trade-offs.

Even when students do the core IS courses like software engineering, data management or enterprise web solutions, they have to apply business thinking to the way they go about designing and creating software solutions, and these software applications often involve analytics-related capabilities.

In addition, nearly all the BSc (ISM) students take a second SMU major from accountancy, business, economics, social sciences, law or a special Advanced Business Technology 2nd major within SIS itself. As of this year, they can also take up the university's new cross-disciplinary analytics 2nd major, which is designed and managed by SIS for the entire university.

Under the Analytics 2nd major, there are five different tracks: marketing analytics, operational analytics, accounting analytics, urban and regional analytics and advanced technology for analytics. Each of these tracks is specially designed to closely align with job opportunities and professional careers in the public and private sectors.

For example, those trained in operational analytics can pursue career opportunities related to supply chain, demand forecasting, or manpower and capacity planning and management. Those trained in marketing analytics have opportunities in digital and social media, digital marketing, and other areas of marketing as well.

Prominent multinational technology firms have come knocking. "Facebook and Google in Singapore have recently hired our undergraduate SIS students because of their combination of information systems capabilities, the SMU business and management background, and specific analytic courses taken like computational thinking, visual analytics and data mining," said Prof Miller.

The Big Four accounting companies have also hired large numbers of SIS undergraduates for consulting and advisory work that very often includes analytics. In addition, the Big Four have also requested SMU's accounting school to train more students in accounting analytics. "As a result, we have partnered with our School of Accountancy to create the Accounting Analytics track in our new Analytics 2nd major," said Prof Miller.

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– Professor Steven Miller (above), Dean of SMU's School of Information Systems and the university's vice provost of research

"Students with the right skills in information systems, analytics and business applications get headhunted," he added. "We even have a few examples of our students getting hired before they even apply for a job because companies went through the SMU resume compilation, saw who had a specific concentration in Analytics, called them up, and hired them."

Professional training

In addition to preparing undergraduates, there are currently 150 postgraduate students in SMU's Master of IT in Business (MITB) programme.

"MITB grooms people who want to harness the power of IT in business settings, and who also need to build managerial skills for strategic transformation and business change projects. Our MITB graduates often work as internal consultants at the interface of IT and the various functional units within the company such as marketing, operations and financial control," Prof Miller said.

The Masters programme has two tracks: financial services, for those taking on more complex roles where they integrate technology with operations, processes and innovation initiatives across the various segments of banking such as retail, payments, trading and asset management; and the analytics track, with courses in customer analytics, operations analytics, social, text, mobile and visual analytics, and using cloud computing for analytics.

To graduate, all MITB students need to do a capstone project that usually extends over a 12-month period. Recent projects at the intersection of financial services and analytics have included marketing campaign analytics for bank credit cards, fraud detection analytics, as well as analytics for improving cash and treasury operations.

Prof Miller recalled a notable capstone project by a former MITB student who was an experienced data centre manager at a multinational bank. He created an analytics framework and supporting spreadsheet model to figure out how to map the bank's forecast of future levels activity by each of its business units into specific capacity requirements for future IT infrastructure in terms of servers, storage, electricity and operational costs. "This project was fantastic because it required integrating know-how across financial services business units, operational planning, data centre management, and analytics for demand forecasting," said Prof Miller.

From Trial and Error to Systematic and Scalable Learning

Based on his extensive industry interactions through the School of Information Systems and through the LARC and LiveLabs projects, Prof Miller realised there are paradigm shifts going on that most of the business community has not caught onto yet.

"Many business people who are aware of analytics mistakenly think that because there is so much publicity for new and better approaches to predictive analytics that they can eventually overcome most of the uncertainty they face as business decision makers. That's not going to happen, because the world somehow always finds new and interesting ways to get more complex and more uncertain.

"Another thing I find curious is that some business people are thinking that analytics is about finding the one optimal answer which you can stick with for an extended period of time. But in today's interconnected, complex, and continuously evolving environment, the answers keep changing over increasingly shorter periods of time," he said.

"I think companies increasingly need to be in a perpetual state of learning, and they need to productionise their ability to learn at scale through systematic and ongoing experimentation. The ability, termed 'scalable learning' by noted researcher and futurist John Seely Brown (who was recently awarded an honorary doctorate degree by SMU), is what sets today's best companies apart from the rest (think Google). This is a paradigm change from 'scalable efficiency', the heretofore dominant paradigm of finding ways to become more efficient at doing things at larger and larger scale through standardising processes and limiting process change and process variability.

"Analytics is the foundation to this new paradigm of Scalable Learning. That's why I think our research projects with LARC and LiveLabs are so important, as they are the initial stepping stones to this new paradigm. We need to move beyond the current common business mindset of using analytics to crunch data to detect patterns and correlations, and quickly taking business decisions without understanding the underlying causal reasons for these patterns.

"For companies to get 'scalable learning' right, they need to more systematically use experimentation within the real-world settings of their customers and data – and combine analytics with experimentation and causal analysis on an ongoing basis. Companies do trial-and-error learning all the time. With modern analytics though, we can move from trial-and-error to systematic experimentation and substantially increase the efficiency and scale of learning across the enterprise. This is what Scalable Learning is about," said Prof Miller.

In conclusion, he noted, "Through our analytics-related education, R&D projects and industry collaborations, we are getting students, research staff, faculty, and our industry partners 'up the experience curve' faster and further with the new generation of analytics. This gets more people trained, and it gives more people the actual experience of seeing what can be done today with these new methods and technologies. We are delighted that SMU overall, and our School of Information Systems in particular, has become an important part of the national ecosystem for helping industry learn-how-to-learn about analytics."

This is the fifth in a monthly series by the Singapore Management University. Next month's feature will examine future trends in management education and potential new business models.