Medway Youth Trust keeps young people on course

Using analytics to guide interventions that help young people remain in education, employment or training

Smart is...

Using predictive models to identify young people who are at risk of dropping out of education, employment or training, and plan interventions to prevent them from becoming disengaged.

Young people who are not in employment, education or training (NEET) are a major concern for Medway Youth Trust, a charity that aims to improve the life chances of young people in the Medway area. The Trust wanted to find a way to identify young people who are at risk of becoming NEET and intervene earlier to give them support.

Hidden Patterns, a social enterprise created by the Trust, used IBM® SPSS® Modeler to analyse huge volumes of text and data from the records of both NEET and non-NEET young people and create a propensity model that can accurately predict whether individual young people in Medway's schools have a high chance (60 percent or higher) of becoming NEET in the future. Combining this information with new insights into the nature of NEET status helps the Trust plan and execute earlier, more effective interventions.

Medway Youth Trust is a charity that exists to improve the life chances of young people and has current contract responsibility for delivering the Connexions service in Medway. Its full-time employees and volunteers help young people in the area make the right choices about their education and career, and provides advice on health, housing, money, safety and a wide range of other issues.

One of the most important issues that the Trust seeks to address is the fact that 6.2 percent of young people between the ages of 16 and 19 in the Medway area are not in education, employment or training – a status known as 'NEET'. The impact of NEET status on a young person's life can be significant, not only in terms of their personal development and long-term wellbeing, but also for society as a whole. According to a 2008 report by the UK Audit Commission, young people who are NEET are likely to cost the country more than £13 billion in public finance costs (for example, welfare payments, costs to health and criminal justice services, and loss of tax and national insurance revenue) and £22 billion in opportunity costs by the time they reach retirement age.[1]

Taking a scientific approach

"Keeping young people in employment, education or training is vital for their own future development, and is a major concern for both central and local government in the UK," comments John Paton, Business Manager at Medway Youth Trust. "Almost every local authority is trying to find ways to identify young people who are at risk of becoming NEET, but in general the methods they are using involve a combination of spreadsheets and anecdotal evidence, and only work on an area level, not an individual level. We wanted to take a more precise and scientific approach."

Gary Seaman, Data Quality Manager, explains: "We had seen how businesses were using statistical modelling tools to predict things like customer churn, and we wondered whether we could do the same thing: create a propensity model that would use the data in our Connexions database to predict whether a given young person was at risk of becoming NEET.

"We looked at various solutions on the market, and decided that IBM SPSS Modeler was the best option for our needs. Our database includes both structured data and unstructured text, and SPSS Modeler was one of the only solutions that seemed to offer both text and data mining

Business Benefits

- Makes a real difference to the lives of young people: as a result of the Trust's interventions, 51 percent of the 723 individuals identified last year as being at risk are now in education, employment or training.
- Reveals new insights that help to plan more successful interventions. For example, the model suggests a strong correlation between mental health issues and homelessness, so early diagnosis and referral are critical.
- Provides a model that is 83.2 percent accurate against historical data – suggesting a high degree of validity for real-world predictions.
- Delivers a 250 percent improvement in accuracy of identification compared to manual search techniques

capabilities. Sometimes the most accurate and detailed information we have about a young person comes from the interviews we have with them, which are written up as free text comments and action plans in our database. If we were only looking at the structured data and ignoring the text from these reports, we wouldn't get a full picture of their situation – so the ability to analyse the text as well is a key advantage."

Harnessing IBM predictive analytics

The Trust decided to go ahead with the purchase of the software, and also engaged IBM for 28 days of consultancy services. Gary Seaman worked closely with an IBM consultant to design a NEET propensity model in SPSS Modeler.

"The propensity model is based on more than 1,000 rules which relate to the factors that seem to affect NEET status, based on historical data from the records of both NEET and non-NEET individuals. By running new data on school-age children through the model, we can use it to predict which of them are most likely to become NEET in the future with a considerable degree of accuracy. The solution generates a report that lists every individual who has a greater than 60 percent chance of becoming NEET, so we can focus our resources on intervening with those who need the most help."

Accurate predictions drive successful interventions

Running the model against historical data suggests that it is 83.2 percent accurate in predicting NEET status, which gives the Trust great confidence that it is a good guide for action. Last year, the model identified 723 individuals as being at risk, and the Trust ensured that contact was made with those individuals via its experienced team of advisers who operate within their respective Medway schools and in the community. One year on, 51 percent of those individuals have reached a positive destination in terms of education, employment or training – suggesting that the Trust's interventions have been successful in a large number of cases.

Smarter Government

Predicting NEET status and intervening successfully

Instrumented

Structured data and text are collected from the Trust's Connexions database, which contains personal information on individuals including interviews with Trust employees.

Interconnected

The NEET propensity model identifies text and data patterns that predict NEET status and reports on all individuals who have a greater than 60 percent chance of becoming NEET.

Intelligent

By using this list and allying it with further insights from the model, Trust employees can plan interventions for individuals who are most at risk, and tailor them to the specific situation. This helps the Trust make better use of a limited budget by allocating resources to the young people who need them most.

Solution Components

Software
- IBM® SPSS® Modeler

Services
- IBM Business Analytics Services

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— Gary Seaman, Data Quality Manager, Medway Youth Trust

"The IBM predictive analytics solution not only helps us identify the young people who are most at risk – it also reveals new insights into the nature of NEET status," comments Gary Seaman. "For example, we have found that there are strong correlations between potential teenage parents and NEET status, and also that a change of family surname amongst females in year 10 indicates a higher propensity for becoming NEET. So this kind of insight helps us plan our intervention strategies more effectively."

Proving the value of interventions

The model has also revealed that the number of contacts that the Trust makes with an individual and the age at which the first contact takes place are significant factors in the subsequent NEET status of that individual.

"The model shows us that our interventions work, and that the earlier they happen in a young person's life, the more effective they are," says John Paton. "This is very encouraging for our staff and volunteers, because it proves that they are really making a difference to people's lives."

Maintaining data quality

The solution also helps the Trust manage data quality more effectively, which helps to ensure that the information fed into the model is as accurate as possible. If there are discrepancies between the structured and unstructured data (for example, if a recent interview states that the interviewee is homeless, but the data record hasn't been assigned homeless status), SPSS Modeler flags the record as an exception for the Data Quality Manager to review. Previously, reviewing all the records manually could take up to a month; with the new solution, this has been reduced to a couple of hours.

Graham Clewes, the CEO of Medway Youth Trust, comments: "We have seen a 250 percent improvement in accuracy compared to a manual search, which is remarkable in terms of time, and we are now able to target our resources in a more effective and efficient manner, giving the right support where it is needed most."

Finding the Hidden Patterns

Building on its success with the solution, Medway Youth Trust has now set up a social enterprise called Hidden Patterns, which aims to help other charities, central and local government organisations develop similar models for predicting NEET status and a wide range of other predictive analytics tools for children's services.

"One project is to identify those young people who are best suited for apprenticeships and other training opportunities," comments Gary Seaman. "Another is looking at predicting first-term drop-outs for a large college in the Medway area. We are also currently working with Medway Council to analyse historical educational data to determine those who need most support when the Government's raising of the participation age becomes statute for all 17-year-olds in 2013 and

18-year-olds in 2015. We have had such success with our NEET model that we're keen to help other organisations see how they can benefit from similar solutions."

To learn more about how Hidden Patterns can help local and national government organisations harness IBM predictive analytics technologies, please contact **gary.seaman@hiddenpatterns.co.uk**

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1 'Against the Odds', Audit Commission, July 2010. See **www.audit-commission.gov.uk**/nationalstudies/localgov/againsttheodds/

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