


See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/27368467>

## Australian teachers' intent to leave teaching profession through logistic regression analysis

Conference Paper · July 2014

CITATIONS  
0

2 authors:



Alex Richardson

Australian National University

117 PUBLICATIONS 108 CITATIONS

SEE PROFILE


Some of the authors of this publication are also working on these related projects:

- Project

Validation study on CFSE + projects on Pathology Quality [View project](#)
- Project

Pharmacists' knowledge, attitudes and practices in relation to infectious skin diseases [View project](#)

READS  
46



Bo Cui

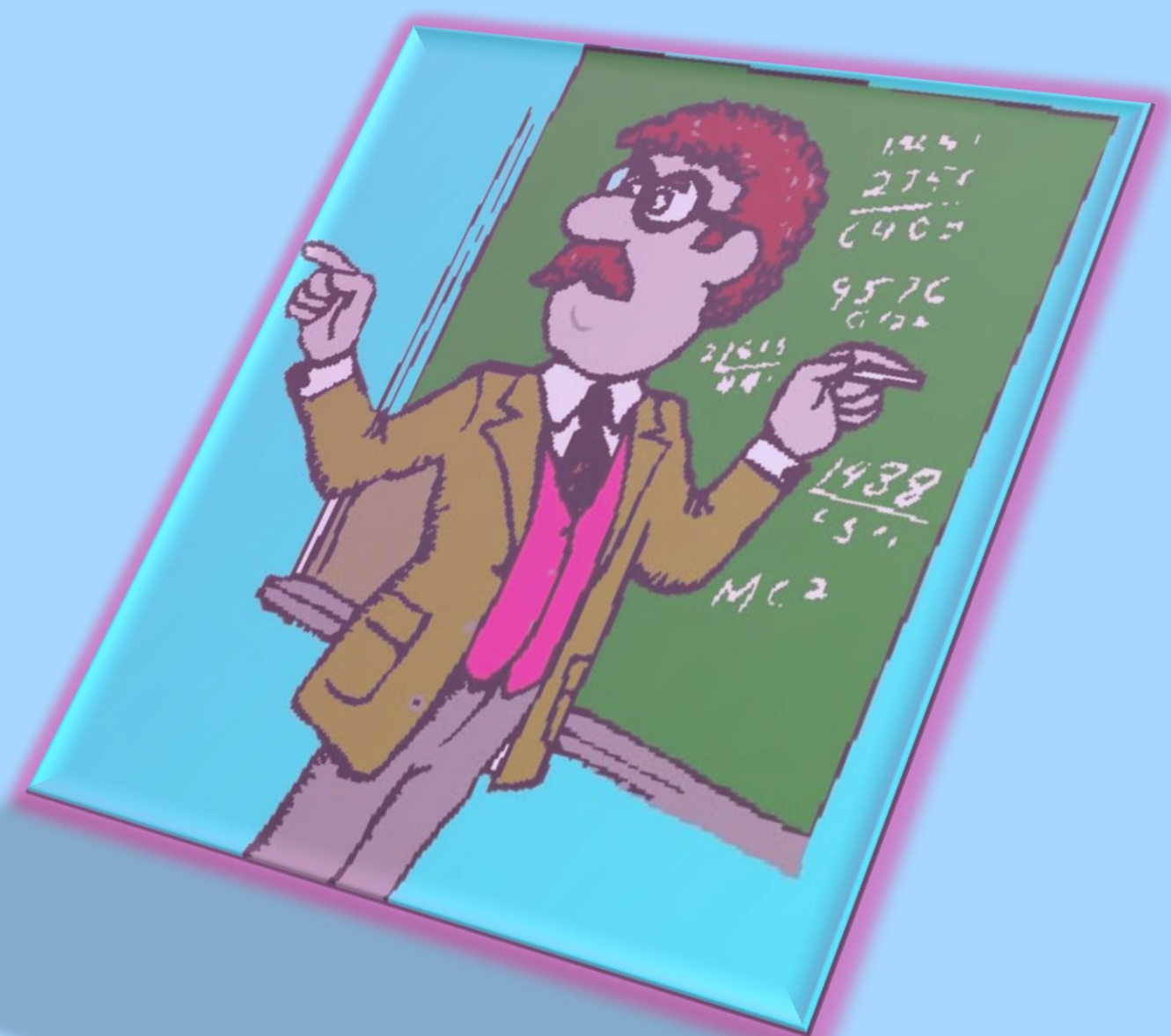
University of Adelaide

2 PUBLICATIONS 0 CITATIONS

SEE PROFILE



# Australian teachers' intent to leave teaching profession through logistic regression analysis



## 1 Background

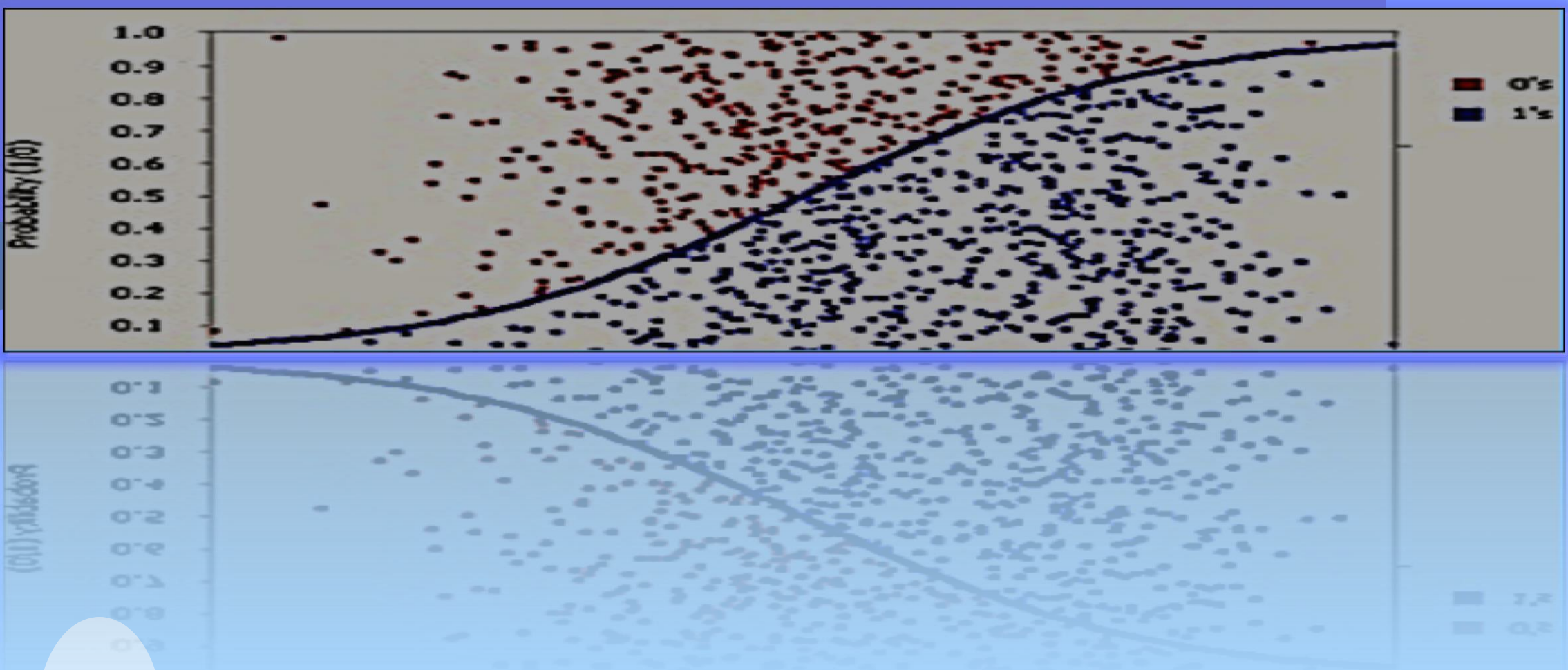
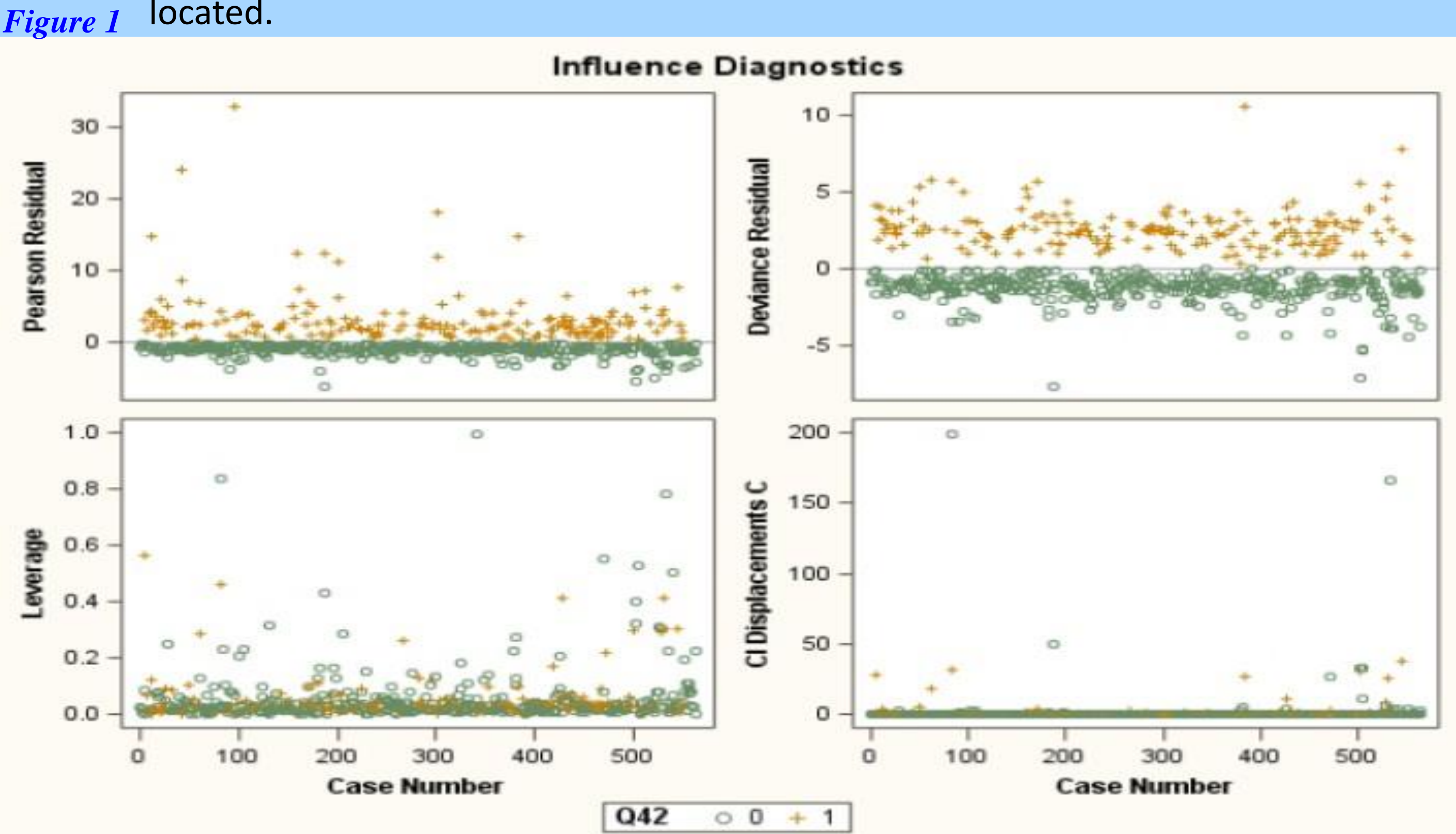
Staff in Australia’s Schools (SiAS) 2010 is the second national survey of approximately 17,000 teachers and school leaders funded by the Australian Government, conducted by the Australian Council for Educational Research (ACER); the first being conducted in 2006-07. It collected data on a wide range of teacher characteristics and workforce issues including: demographic items, professional learning, qualification, future career intention, and career path. One of the major purposes of this national survey was to provide relevant data to inform teachers staffing issues and teacher workforce planning. (McKenzie, Rowley, et al., 2011). The data is self-reported and data quality generally regarded as good.

The first aim of this project was to use logistic regression to estimate Australian teachers’ Intent to permanently leave teaching profession prior to retirement. Another aim was to identify the factors (or independent variables) that could most accurately predict teachers’ intention to leave.

## 2 Methods

We used logistic regression model as the analysis method, and SAS software to perform the data analysis. Logistic regression analysis predicts the values on response variables from one or more independent variables when the response variables are dichotomous (Foster, 2006). Maximum Likelihood and Least Squares are two proven successful point estimate methods. (Panik, 2005). A computer program can’t judge the validity or appropriateness of the methods used; in order for the model to accurately explain the data, making some assumptions about the data is necessary (Zeltermann,2000). In terms of assessing the fitness of the logit model, using a single statistic would not be sufficient, as the model is multidimensional by nature with the need of residual analysis (Pigeon & Heyse, 1999). We used Likelihood Ratio statistics and a series of residuals/influential diagnostics plots. The diagnostic graphs are used for the purpose of detecting influential points against predicted probability, and against case number.

The example plots in Figure 1 show the influence diagnostics for the model described below, predicting Q42 (which is *Planning to leave teaching permanently prior to retirement*), against case number. If Pearson Residuals or Deviance Residuals are greater than ±2 in magnitude, it indicates potential outliers (Zeltermann, 2010). So, there would be a number of influential points in the diagnostic plots which can be easily located.



## 3 Results

In terms descriptive statistics for the response variable: 75% teachers intend to stay and 25% teachers intend to leave the teaching profession prior to retirement. Descriptive statistics for the independent variables include: About 13% teachers are from ATSI focus school, 87% from non ATSI focus school. Teachers’ age are spreading from 21 to 78 years old.

A ROC curve is the global logistic regression performance indicator,. We found an area under the ROC curve(figure 2) of around 70% (0.6829), which means the model correctly classified 68.29% of the cases (leave or stay) based on observations, thus the logit model can be regarded as an acceptable (Hosmer,2000).

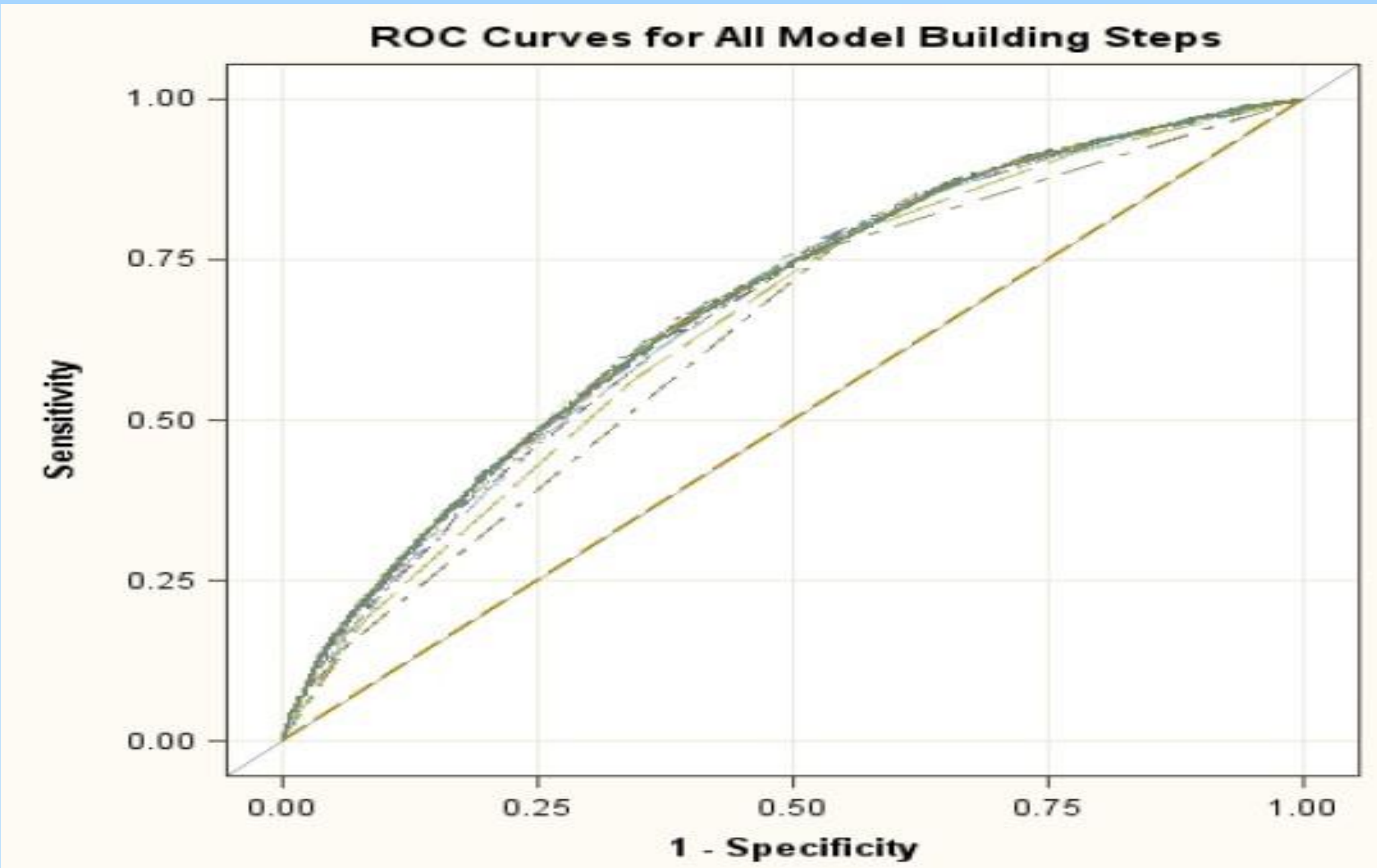
The summary of final logistic regression model and maximum likelihood estimations of parameters are showed in following **table 1**.  
*ATSI focus: aboriginal and Torres strait islander focus school*  
*Q1a:Age has been recoded to 3 levels: less than 30, 30-50 and over 50*  
*Q3: aboriginal and Torres strait islander origin*  
*Sector: School Sector*  
*Q2:gender*  
*Q7:Highest qualification*  
*Q19: hours spent per week for face to face teaching*  
*Q29a:how long is first school*  
*Q13: Full or part-time employment*  
*Q50g:Satisfaction with salary*  
*Q50n:Satisfaction with work relations*  
*Q50i:Satisfaction with student behaviour*  
*Q33:first school in which sector*

Based on Wald tests, all the predictors are statistically significant(<.05).

Table 1:

Analysis of Maximum Likelihood Estimates						
Parameter		DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
Intercept		1	-0.0942	0.0429	4.8122	0.0283
ATSIFocus		1	0.2656	0.0274	94.2560	<.0001
Q1a	1	1	0.9972	0.0376	701.8880	<.0001
Q1a	2	1	0.2002	0.0233	73.8549	<.0001
Q3		1	-1.3128	0.1719	58.3242	<.0001
Sector	1	1	-0.2972	0.0159	349.4888	<.0001
Sector	2	1	0.2194	0.0176	154.6570	<.0001
Q2		1	-0.4401	0.0237	345.4271	<.0001
Q7		1	0.3308	0.0164	406.7543	<.0001
Q19		1	-0.00801	0.00117	46.8413	<.0001
Q29a		1	-0.0216	0.00244	77.9145	<.0001
Q13		1	-0.2820	0.0209	182.5973	<.0001
Q50g	1	1	-0.4874	0.0274	315.7592	<.0001
Q50g	2	1	-0.1403	0.0141	99.4134	<.0001
Q50g	3	1	0.1931	0.0152	161.7305	<.0001
Q50n	1	1	-0.6111	0.0264	534.1697	<.0001
Q50n	2	1	-0.3190	0.0258	152.9160	<.0001
Q50n	3	1	0.3277	0.0342	91.8408	<.0001
Q50i	1	1	-0.4157	0.0199	437.3002	<.0001
Q50i	2	1	-0.2681	0.0126	453.7655	<.0001
Q50i	3	1	0.2651	0.0146	331.5726	<.0001
Q33	1	1	-0.0587	0.0144	16.6225	<.0001
Q33	2	1	0.0523	0.0170	9.4788	0.0021
Q1a*Sector	1 1	1	0.0685	0.0235	8.5214	0.0035
Q1a*Sector	1 2	1	-0.2570	0.0268	91.7093	<.0001
Q1a*Sector	2 1	1	-0.0564	0.0161	12.3120	0.0005
Q1a*Sector	2 2	1	-0.0851	0.0185	21.1048	<.0001
Q2*Q1a	1	1	-0.1214	0.0411	8.7114	0.0032
Q2*Q1a	2	1	-0.1312	0.0264	24.7778	<.0001

Figure 2



## 4 Conclusions

◆Younger age teachers(less than 30 years old) are around 9 times more likely to leave teaching profession compared to more than 50 years old teachers.

◆If teachers are very unsatisfied with the salary, working relationship and student behaviour, she or he will be highly likely to leave.

◆Middle age teachers (30-50 years old) are 4 times more likely to leave compared to more than 50 years old teachers.

◆An aboriginal teacher is roughly only a quarter chance to leave compared to non-aboriginal teacher .

◆Female teachers are 36% less likely to leave compared to male teachers.

## 5 References

Foster, J., Barkus, E., and Yavorsky, C., (2006). *Basic Features of Statistical Analysis and the General Linear Model. Understanding and Using Advanced Statistics*. London: SAGE Publications, Ltd

Hosmer D.W & Lemeshow, S. (2000) *Applied logistic regression* (2ed) Wiley, New York.

McKenzie, Rowley, et al., (2011). *Staff in Australia’s School 2010: Main Report on The Survey*. Retrieved from: <http://www.deewr.gov.au/Schooling/Documents/SiASMainReport.pdf>

Panik,M.J. (2005). *Advanced Statistics from an Elementary Point of View*. Elsevier Academic Press.

Pigeon,J.G. & Heyse,J.F. (1999). *A Cautionary Note about Assessing the Fit of Logistic Regression Models*. Journal of Applied Statistics. P. 847.

Zeltermann, Daniel (2010). *Applied Linear Models with SAS*. Retrieved from: <http://canberra.eblib.com.au.ezproxy1.canberra.edu.au/patron/FullRecord.aspx?p=542915>

## Acknowledgements

We would like to thank the Australian Commonwealth Department of Education, Employment and workplace Relations (DEEWR, currently as Department of Education) Teacher Quality and Workforce Data Branch and staff members Paul Hunt, Catherine Quinn and Jan Febey for the permission of the access to SiAS data set and their kind support.