Multivariate Analysis of Principal Demographics on School Climate in Kelantan, Malaysia

Ang John Sun
Faculty of General Studies and Advanced Education
Universiti Sultan Zainal Abidin, UniSZA
Kuala Terengganu, Terengganu, Malaysia

Abdullah Ibrahim
Faculty of General Studies and Advanced Education
Universiti Sultan Zainal Abidin, UniSZA
Kuala Terengganu, Terengganu, Malaysia

Mustafa Mamat
Faculty Informatics and Computing
Universiti Sultan Zainal Abidin, UniSZA
Kuala Terengganu, Terengganu, Malaysia

Mohamad Arif Awang Nawi
Faculty Informatics and Computing
Universiti Sultan Zainal Abidin, UniSZA
Kuala Terengganu, Terengganu, Malaysia

Abstract

The principal is the person who is responsible for all activities that occur at school. Principals are also consultants, advisors and coordinators for teaching and learning programs in schools. The role of school principals not only administrators but they also have to engage in professional activities of teachers and students. School climate is depicted through the personality of an individual
and how the teacher strives to reach the level of school climate organization. Demographic factors that influence the level of school leadership in effective schools and less effective schools. These factors include age, gender, and experience in school administration. There are three factors that influence the school climate in this study, namely the age, gender and years of working experience of the principals. The multiple linear regression analysis was used in this study and analyzed by using SPSS software. What is the relationship between the demographic factors of the principal (age, gender, and years of working experience) to school climate? Overall, independent variables such as age, gender and years of working experience are factors that influence school climate. The results of the data analysis by using multiple regression methods showed that age ($\beta = 0.219, p < 0.05$), gender ($\beta = 0.807, p < 0.05$) and years of working experience of principals ($\beta = 0.203, p < 0.05$) were factors contributing to school climate.

**Keywords:** Multivariate, School Climate, Principle Demographics

### 1 Introduction

Does age, gender and totals years of experience as principal play a role in school climate? The principal is the person who is responsible for all activities that occur at school. Principals are also consultants, advisors, and coordinators for teaching and learning programs in schools. The role of school principals not only administrators but they also have to engage in professional activities of teachers and students [1]. In the context of Malaysian education, principals and headmasters are the primary leaders in school and they have a role to govern, manage and teach the school. Ibrahim [2] states that if the atmosphere, school climate, geographical area, student profile, community and leadership style of a school differ then perceptions about leadership are also different. Rooney [3] believes that principals who truly understand the importance of student learning will produce an effective and conducive learning environment for their students. This is because leadership is a key role as a principal.

Harris and Lowery [4] examine the school climate that states that school climate is depicted through the personality of an individual and how the teacher strives to reach the level of school climate organization. Next, Howard [5] defines the school climate as a social and cultural environment of the school that affects the behavior of every individual in it. Speltini and Buzzi [6] define the school climate as a good school environment where the environment is comfortable, peaceful, friendly, and cheerful with a smooth learning process.

Marschilok [7] states that principals' leadership can affect school climate. Iwanicki [8] reports that the most important aspect of public school administration is to have a vision such as Intent Process and its outcome. In this case, the achievement of a school is not seen solely from academic achievement but more
importantly, it can produce a holistic student of intellectual, social, physical and adaptable skills in any situation and circumstances.

Previous studies showed that most of the principal demographic factors have a significant relationship to a positive school climate and academic achievement. However, demographic factors such as age, gender and working experience more impact on a positive school climate and improve academic achievement. Age is one of the principal problems in improving talent management among teachers. This problem can be seen when the older people experience more teaching than the younger ones. Young people lack the knowledge and experience in the management of school development and cause talented teachers to be hard-earned. In addition, they lack the skills in which the aged will be retired and replaced with new teachers who are still lacking in skills. The challenge in creating a talented individual to improve work performance is that when the number of aged workers has started to decline dramatically and the organization has begun to realize the impact of demographic changes will affect its productivity [9-11].

Goleman [12] states that there are three demographic factors that influence the level of school leadership in effective schools and less effective schools. These factors include age, gender, and experience in school administration. Research on this demographic factor is necessary to take into consideration the factors affecting the emotional competence of a school leader. This is because the emotional intelligence of leaders in an organization requires research in popular aspects such as gender, age and experience of the administration to ensure accuracy in examining the critical elements required by an effective leader in an organization [12].

Over the years, many researchers have shown an interest in researching which gender is most appropriate to be a good leader. Competition in the opinion of this gender continues to grow so there are some strong arguments about which gender can be a better leader. As reported by Carr et al. [13] women and men lead differently and they both approached the students with a unique leadership role of its own. The gender of school principals can be compared to the success of the school for the purpose of this study. However, years of work experience can also affect the success of a school. This information is collected through demographic studies [13].

The previous studies indicate students 'academic performance is determined by various factors and one of them is the principals' experience [14]. The principal is the experienced leader in the school. As teachers, their work is much connected with students and all activities in the classroom. According to Hussein [1] they have little knowledge of the administration and management tasks. This means that from the point of experience, principals are acknowledged to have a high and extensive experience as a teacher. However, the experience is not necessarily sufficient to lead a composite school organization, constantly changing and exposed to the various pressures, demands and wants of the community [1]. The aim of this study was to determine the relationship between the principal demographic factors such as age, gender and years of experience
working on the school climate. The results of the study will help other secondary schools to see their current practice to improve school climate.

2 Materials and Methods

Population and Sample Size: A total of 90 teachers and 90 principals in Kelantan have been taken to carry out this analysis. The sample size necessary for this analysis considered level of significance, power, and effect size. For the purpose of this research, the significance, or alpha level \( \alpha \) is the probability “Used to determine whether the outcome is significant or not” [15]. The alpha criteria used for this research was \( \alpha = .05 \), which indicates a 95% confidence level of a correct conclusion when the null hypothesis was true. The power of a significance test is the probability of rejecting the null hypothesis when it is false or the probability of committing a Type II error. The level of power for this research was set at .80 and was considered in determining the sample size a priori [16].

School climate was measured using the Organizational Health Inventory (OHI) for middle school teachers was used to identifying school climate based on teacher perception. The surveys were combined into a single format to be administered electronically. The Organizational Health Inventory (OHI) for middle school teachers contained 50 questions with a Likert-type response scale to include four possibilities: RO (Rarely Occurs), SO (Sometimes Occurs), O (Often Occurs), and VFO (Very Frequently Occurs).

The OHI-M instrument, originally developed by Halpin and Croft [17] and revised by Hoy et al. [18] broke down respondents’ selections pertaining to climate into six key dimensions. These dimensions included: a) supportive principal behavior, b) directive principal behavior, c) restrictive principal behavior, d) collegial teacher behavior, e) committed teacher behavior and f) disengaged teacher behavior [18, 19]. The respective reliability scores for each subtest on the middle school version included: “Supportive (.96), Directive (.88), Restrictive (.89), Collegial (.90), Committed (.93) and Disengaged (.87)” [18]. The properties of the six subtests of the OCDQ-RM are strong. All the scales have high reliability coefficients, with the reliability of the subtests on this final form being higher than the pilot.

Multiple Linear Regression Analysis: Regression analysis is a useful statistical technique for examining and modeling relationships between variables. Variables are divided into two such as dependent variables and independent variables. The independent variable is the set parameter and the dependent variable is random and relies on parameters. Regression analysis is applied and studied widely in economics, biological sciences, technical, social sciences and agricultural sciences. Regression analysis can also be used for predictions, hypothesis testing and conclusions.

Regression analysis is used to obtain the relationship of two variables or more variables. Meanwhile, correlation analysis is used to see the relationship
Multivariate analysis of principle demographics ... 223

between the variables. The regression model specifies the relationship between the dependent variable and the independent variable. When the model has one dependent variable and one independent variable, then it is called a univariate regression model. However, if the model has one dependent variable and more than one independent variable, then the model is called multiple regression analysis. The analysis used in this study was analyzed by using SPSS software.

The multiple linear regression equation models are as follows:

\[ Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \ldots + \beta_kX_k + \epsilon \]

where,
- \( Y \) = Dependent variable
- \( X_i \) = Independent variables \( (i = 1, 2, 3...) \)
- \( \beta_0 \) = Constant
- \( \beta_i \) = Regression coefficient \( (i = 1, 2, 3...) \)
- \( \epsilon \) = Error

There are three factors that influence the school climate in this study, namely the age, gender and years of working experience of the principals. Next, the multiple linear regression models constructed for the factors affecting the school climate as follows:

\[ Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 \]

where,
- \( Y \) = School climate
- \( X_1 \) = Age
- \( X_2 \) = Gender
- \( X_3 \) = Years of working experience of the principals

**Testing the Hypotheses:** One of the goals in the multiple regression analysis is to test hypotheses about the parameters of the model. To test whether multiple regression models was used to generate the relationship between the dependent variable and the independent variables is acceptable or not, the test-F (ANOVA) and t-test should be carried out. The following hypotheses will be tested in this study:

i. Null Hypothesis stated: There was no significant relationship between the principal demographic factors (Age, gender and years of working experience) on school climate.

ii. The alternative hypothesis stated: There was significant relationship between the principal demographic factors (Age, gender and years of working experience) on school climate.
3 Results and Discussion

Normality assumption in the multivariate analysis was tested by Q-Q plot. Since the points are approaching normal lines, data for school climate is normal, so multivariate analysis can be done. The results by using multiple regression analysis are shown below:

![Normal Q-Q Plot of School Climate](image)

**Figure 1: Normal Q-Q Plot of School Climate**

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.845</td>
<td>0.714</td>
<td>0.704</td>
<td>0.157</td>
</tr>
</tbody>
</table>

Table 1 show the r square value as much as 0.714. The combination of the three predictor variables such as age, gender and years of principals' working experience accounted for 71.4 percent (r = 0.845) variation in variance on school climate. The high r square value indicates that the principal's age, gender, or years of experience have a very high impact on school climate. Overall, the null hypothesis was rejected and showed a significant relationship between demographic factors, namely age, gender, and years of experience working in the school climate.

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Regression</td>
<td>5.302</td>
<td>3</td>
<td>1.767</td>
<td>71.719</td>
</tr>
<tr>
<td></td>
<td>Residual</td>
<td>2.119</td>
<td>86</td>
<td>0.025</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>7.421</td>
<td>89</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
In Table 2, the ANOVA results show that significantly, the third three predictor variables are contributing factors to the school climate \( [F (3, 86) = 71.719, p < 0.05] \). Overall, independent variables such as age, gender and years of work experience are factors that influence the dependent variable namely school climate.

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
</tr>
<tr>
<td>1</td>
<td>(Constant)</td>
<td>1.542</td>
</tr>
<tr>
<td>Age</td>
<td>0.081</td>
<td>0.037</td>
</tr>
<tr>
<td>Gender</td>
<td>0.457</td>
<td>0.056</td>
</tr>
<tr>
<td>Years of working experience</td>
<td>0.114</td>
<td>0.051</td>
</tr>
</tbody>
</table>

The results of the analysis using multiple regression methods show that all independent variables such as age, gender and years of working experience of principals are contributing factors to school climate. The t-statistic value is greater than the critical value at a significant level less than 0.05. This shows that the age, sex and years of principals' work experience have a positive and significant impact on the school climate. Effects of age, gender, and years of work experience principals on school climate is positive, this is because the estimated coefficients for all the variables are 0.081, 0.457 and 0.114. For age’s principal, positive impact means that higher age of the principals, the better school climate. For gender variables, female principals will create a more positive school climate than male principals. For variable years of work experience, the positive effect means the longer the period of school principals’ experience, the better the climate of their schools.

4 Conclusions

What is the relationship between the demographic factors of the principal (Age, gender, and years of working experience) to school climate? Overall, independent variables such as age, gender and years of working experience are factors that influence school climate. The results of the data analysis by using multiple regression methods showed that age \( (\beta = 0.219, p < 0.05) \), gender \( (\beta = 0.807, p < 0.05) \) and years of working experience of principals \( (\beta = 0.203, p < 0.05) \) were factors contributing to school climate. The higher the principal's age, the better the school climate is. Women's principals create a more positive school climate than male principals. The longer the school principal's experience, the better the school climate is. Louis et al. [20] reports that principals have an impact on student learning and the results of this study have supported their findings.
References


Received: January 19, 2018; Published: February 14, 2018