Model Selection–Backward Elimination Technique for Study the Factors Affecting the Quality of Education

(An applied study of Princess Nourah bint Abdul Rahman niversity)

Karema Ahmed ELsayed

Assistant Professor, Department of Business Administration

Faculty of Business &Administration

Princess Noura bint Abdurrahman University, Saudi Arabia

Lecturer, Department of Statistics, Faculty of Commerce

Al-Azhar University, Egypt

kaali@pnu.edu.sa

Abstract:

This study was conducted to study the various factors affecting the level of quality of education as measured by the cumulative rate of the student GPA for a random sample of 160 students of The University of Princess Noura Bint Abdul Rahman and conducted a survey using a questionnaire to collect information on the various factors related to the level of quality of education. The ANOVA test was applied to investigate the impact of different factors on the cumulative rate of students. The results of the study revealed that (age, social status, income level , parental education, characteristics of the teacher, the personal skills of the student, the nature of the courses, the availability of the curriculum references, the role of academic guidance, the role of guidance and psychological guidance, the role of quality management, the role of technical support, the role of social support, medical care and finally the role of administrative leadership) have an effective impact on the quality of education as measured by the cumulative rate of students GPA.

Model Selection –Backward (Stepwise Regression) Elimination Technique used to identify the most influential factors in the level of quality of education and found to be the level of education of parents, the degree of competence of the teacher, the personal skills of the student, the nature of the courses, the availability of references, the role of academic guidance, the role of psychological guidance, the role of quality management and finally the role of successful management leadership.

Keywords: Model Selection –Backward Elimination –Stepwise Regression Elimination Technique – Quality of Education.

1. Introduction

In many regression problems, we are interested in finding important explanatory factors in predicting the response variable, where each explanatory factor may be represented by a group of derived input variables. The most common example is the multifactor analysis-of-variance (ANOVA) problem, in which each factor may have several levels and can be expressed through a group of dummy variables. The goal of ANOVA is often to select important main effects and interactions for accurate prediction, which amounts to the selection of groups of derived input variables.(Acton et al., 2009)

The best regression for subgroups is the model selection approach which consists of testing each possible set of forecast variables, then selecting the best model according to some statistical criteria.(Claeskens & Hjort, 2008)(Li & Liang, 2008)

In this era of globalization and technological revolution, education is considered as a first step for every human activity. It plays a vital role in the development of human capital and is linked with an individual's well-being and opportunities for better living.(Battle & Lewis, 2002)

It ensures the acquisition of knowledge and skills that enable individuals to increase their productivity and improve their quality of life. This increase in productivity also leads towards new sources of earning which enhances the economic growth of a country. (Saxton, 2000)

However, this study used multiple regression analysis , ANOVA to prove the hypothesis test and relationship between the variable and Model Selection –Backward (Stepwise Regression) Elimination Technique used to identify the most influential factors in the level of quality of education.

2. Research problem:

The quality of education is one of the most important indicators of the progress of countries globally, many studies presented a model for

multiple regression of factors that affect the quality of education. The research problem is summarized in using the model selection-backward elimination technique to determine the best of these factors and the most influencing the quality of education.(Almarghani & Mijatovic, 2017)

3. Research objective:

The main objectives of the study were:

1- Analysis of the impact of demographic factors on the quality of education.

2- Analysis of the impact of factors related to the educational environment on the of quality of education.

3- Use a model selection-backward elimination technique to find the most influential factors in the multiple-regression model for quality education.

4. Research Importance

The importance of this research is due to determine the extent of the possibility of using the model selection-backward elimination technique to determine the most influencing factors in the quality of the educational process from a set of interrelated variables (age, marital status, income level, parents 'education, teacher attributes, the personal skills of the student, nature of the curricula, availability of the necessary climate for the educational process, availability of academic references for decisions, the role of academic counseling, the role of psychological counseling, the role of quality management, the role of technical support, The role of social support, medical care and finally the role of administrative leadership considering the degree of student achievement (GPA) as a measure of the quality of education, this study is expected to draw attention to the interest in developing these factors to increase the quality of the learning process.(Almarghani & Mijatovic, 2017)

5. Research hypotheses

a) There is no significant effect of demographic factors (age, social status, income level , parental education) on the quality of education.

b) There is no significant effect of the impact of factors related to the educational environment (characteristics of the teacher, the personal skills of the student, the nature of the courses, the availability of the curriculum references, the role of academic guidance, the role of guidance and psychological guidance, the role of quality management, the role of technical support, the role of social support, medical care and finally the role of administrative leadership) on the of quality of education.

6. Literature Review

The quality of education remains a top priority for educational institutions. It aims to bring about change locally, regionally, nationally and globally. Teachers, trainers and researchers have long been interested in exploring variables that effectively contribute to raising the quality of education.

Regarding the quality of education, Leu and Price-Rom (2005) contend that the issue of quality has become critical in many countries that are expanding enrolments and in nations with constrained resources. Success in increasing access to basic education has often led to declining quality. However, in searching for the factors that promote quality, national programs and literature have increasingly emphasized teachers, schools, and communities as the engines of quality, with special attention to teacher quality identified as a primary focus.(TUOK, 2018)

(Alexander,2008 & Kamens2010) asserts that the growing emphasis on the need for quality to accompany the expansion of education.(Alexander, 2008)(Kamens & McNeely, 2010)

Also, Nicholson (2011) has defined quality education as a transformation. The assumption here is that education must concern itself with transforming the life experiences of students by enhancing or empowering them.

According to Mbiti (2014), educational planning is the description or identification of events, conditions, or needs Some future actions are timely, for example predicting the number and types of students and Expanding the facilities needed for them. Educational planning Preventing the problem, that is, it reduces the potential of the educational problem You run into it sometime.(Kiboss & Jemiryott, 2014)

improvement of human resources closely related to the quality of education as it associated with high learning achievement. According to Chapman et al. Mohamed (2012) as stated in Pangeni (2014) mentioned that although educators and researchers have yet to agree upon a consensus on the nature of educational quality and its determinants, it is typically measured by higher achievement in examinations. The academic achievement of students is a matter of real concern in most universities in the world. As a result, it can be assessed by looking at students' Cumulative Grade Point Average (CGPA) results at the end of the semester. Many variables affecting students' academic achievement, and they have been investigated using different kinds of questionnaires.(Demir et al., 2009)(Al-Agili et al., 2012)

According to Ali et.al (2009) as stated in Mushtaq & Nawaz Khan (2012) mentioned that schools, colleges, and universities have no worth

without students as they are a most essential asset for any educational institution. The students' academic achievement plays an important role in producing the best quality graduates who will become great leaders and manpower for the country thus responsible for the country's economic and social development. Students' achievement in University Technology Mara was based on their Cumulative Grade Point Average (CGPA). Some of the students won't be able to complete their studies in the final semester because they had failed a certain subject in every semester that leads them to be dismissed. This scenario happened because of several factors such as family characteristics, self–efficacy, and university features.(Ali et al., 2009)(Mushtaq & Khan, 2012)

Model Selection –Backward (Stepwise Regression) Elimination Technique

We can fit thousands of models at the push of a button by using given a data set, but how do we choose the best?

Choosing a model is central to all statistical work with data. We have seen rapid advances in model fitting and the theoretical understanding of model selection Multiple Linear Regression is a type of regression where the model depends on several independent variables (instead of only on one independent variable as seen in the case of Simple Linear Regression). Multiple Linear Regression has several techniques to build an effective model namely:

- All–in
- Backward (Stepwise Regression) Elimination
- Forward Selection

- Forward selection begins with an empty set of selected variables, and variables are added one at a time until a stopping criterion is reached.

- Backward elimination begins with all variables selected and eliminates variables one at a time until a stopping criterion is reached

In this research, we will implement multiple linear regression using the backward elimination technique.(Mushtaq & Khan, 2012)(Claeskens & Hjort,   2008)

Backward Elimination consists of the following steps:

Figure (1) shows the Backward Elimination consists of the following steps It is as follows:

1. Select a significance level to stay in the model (eg. SL = 0.05)
2. Fit the model with all possible predictors
3. Consider the predictor with the highest P–value. If P>SL, go to step (4).
4. Remove the predictor.
5. Fit the model without this variable and repeat the step c until the condition becomes false.

We cane Backward Elimination – Stepwise Regression by using R packages or Excel program

Figure (1): The steps of Backward Elimination
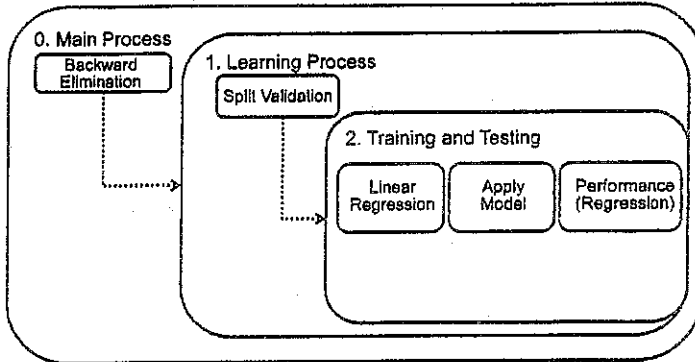
7. Research Methodology

The research methodology is the study of how to conduct the study scientifically. It explains how the study is conducted and the various processes it went through. this includes data collection, data sources and variables, research design and research framework, hypothesis building, data analysis and processing, and highlights the statistical technique used in determining the relationship between model variables.

7-1 Sample and data collection method

This methodology indicates how to collect study data. To complete this study, a few strategies have been harmonized to ensure that the data obtained are consistent with the results. Besides, the method and tools used in selecting and building the techniques that were used are explained. This study focused on only 160 of the 1210 students from the Business administration program – Princess Nora Bint Abdul Rahman University. ١٧٠ paper questionnaires were distributed, 165 of them obtained only 160 Honest answers serve the research objectives, They have been selected by using simple random sampling as basic sampling technique to minimize bias and offer most generalizability.

The questionnaire was divided into two parts, the first section expresses the demographic background of the respondents (age, marital status, financial status, parent education) and the second section contains 11 elements (teacher characteristics, the personal skills of the student, the nature of the courses, the availability of the necessary climate for the educational process, the availability of Course references, the role of academic counseling, the role of guidance and psychological counseling, the role of quality management, the role of technical support, the role of social support, medical care and finally the role of administrative leadership) considering all the previous elements are independent

factors affecting the quality of education, which was measured by the degree of student achievement (GPA) as a dependent variable.

7-2 Statistical analysis model:

Model Selection: Backward–Stepwise Regression Elimination Technique

Backward Elimination consists of the following steps:

Step-1: Firstly, select a significance level to stay in the model. (SL=0.05)

Step-2: Fit the complete model with all possible predictors/independent variables. (X_1, X_2, X_3, X_4, ...X_{15}).

Where:

The independent variables of the estimated multiple regression model as following:

X_1: age, X_2: Social status, X_3 Income level, X_4: Parent education, X_5: Efficiency of the teacher, X_6: Student self-skills, X_7: Nature of the courses, X_8: References, X_9: Academic Advising, X_{10}: Psychological counseling, X_{11}: Quality Management, X_{12}: Technical support, X_{13}: social support, X_{14}: medical care, X_{15}: Administrative leadership.

Y: (GPA), The dependent variable as an indicator of education quality.

Step-3: the predictor which has the highest P-value, such that.

If P-value >SL, we go to step 4.

Else Finish, and Our model is ready.

Step-4: Remove that predictor.

Step-5: Rebuild and fit the model with the remaining variables.

We performed a Backward (Stepwise Regression) Elimination Technique using R-packages. (Claeskens & Hjort, 2008)

7-3 Reliability

The reliability test is important to ensure the consistency of the measuring instrument to measure the intended purpose of research. The value of Cronbach's Alpha is used to determine the consistency of the measurement. According to George and Mallery they provided a better rule of thumb regarding Cronbach's Alpha which stated that value 0.9–1.0 is excellent, 0.8–0.89 s good, 0.70.79 is acceptable, 0.6 and 0.6–0.69 is questionable while 0.5–0.59 is poor and the value less than 0.5 is unacceptable. (Sekaran & Bougie, 2016)

Table (1) shows the validity of the questionnaire Alpha Cronbach was 0.91. confirms the sincerity and consistency of the questionnaire questions (64 questions.).

Table 1: The validity of the questionnaire (Cronbach's Alpha coefficient)		
Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.912	0.9087	64

7-4 Descriptive statistics analysis

The Standard Deviation in the table (2) shows the relation that a set of independent variable scores has the mean of the 162 samples.

The study showed that 98% of the respondents are between ١٧–٢١ years old, middle income, and single, it also indicated that almost 67% of the sampled individuals were uneducated parents.

It was also the highest response to the effect of the model variables on the level of educational quality, which was measured by the cumulative average of students due to the nature of the decision, where the

approval rate reached 0.93%, followed by the importance of the teacher's efficiency, which reached 87%, the importance of academic counseling reached 0.78%, and the study showed that the effect of both Among the variables (availability of references, psychological counseling, quality management, availability of financial and social support, medical care and administrative leadership) are very close, ranging between 0.75% −0.72%.

Table 2: Descriptive analysis of model ariables			
	N	Mean	Standard Deviation
Age	160	17.9375	0.405882453
Income level	160	1.89375	0.456908879
Social status	160	0.9	0.300941918
Parent education	160	0.6625	0.474341649
The efficiency of the teacher	160	21.8188	2.87665047
Student self–skills	160	19.5813	3.9020586
Nature of the courses	160	23.275	2.024845673
References	160	18.7938	3.47515327
Academic Advising	160	19.4813	3.867249807
Psychological counseling	160	18.0875	4.554888866
Quality Management	160	18.3313	4.392277206
Technical support	160	18.2813	4.587612354
social support	160	18.325	4.353195891
medical care	160	18.2313	4.503278854
Administrative leadership	160	18.5688	4.488450413

7–5 Regression statistics analysis

Multiple regression analysis is a powerful and flexible procedure for analyzing the correlation between a dependent variable and more than one independent variable. The suitability of the model designed for this

study is examined by this type of standard regression analysis. The analysis shows the amount of total variance in the dependent variable that can be explained by the independent variables.(Rawlings et al., 2001)

Table (3): Regression Statistics	
Multiple R	0.696588
R Square	0.485235
Adjusted R Square	0.446976
Standard Error	0.438041
Observations	160

Based on Table (3), the adjusted coefficient of determination or also known as R represents the value of 0.447. The scores indicate that 45% of the changes in the dependent variable (GPA) As an indication of the quality of education can be explained by the independent variables(age, Social status, Income level, Parent education, Efficiency of the teacher, Student self-skills, Nature of the courses, References, Academic Advising, Psychological counseling, Quality Management, Technical support, social support, medical care, Administrative leadership). The R Square value is 0.485 (49%) show the relationship between the dependent and independent variables for this study. For this study, it can be considered that there is a relationship between dependent and independent variables.

7-6 Analysis of variance

Analysis of variance (ANOVA) is an extremely important method in exploratory and confirmatory data analysis. Unfortunately, in complex problems, it is not always easy to set up an appropriate ANOVA. We propose a hierarchical analysis that automatically gives the correct

ANOVA comparisons even in complex scenarios. The inferences for all means and variances are performed under a model with a separate batch of effects for each row of the ANOVA table. (Gelman, 2005)

Table (4): ANOVA					
Model	df	Sum of Squares SS	Mean Square MS	F	Significance F
Regression	11	26.76922	2.433565	12.68272	1.09E-16
Residual	148	28.39829	0.19188		
Total	159	55.16751			

From the table (4) above, the p-value = 0.00< α =0.05. So, we can conclude that the model is adequately fit. The model is significant and can proceed with this hypothesis. We believe from looking at the table above that the model is significant because there appears to be a "strong" two- way interaction between variables.

7-7 Statistical analysis of Backward -Stepwise Regression Elimination Technique

Using the R Program Package for Statistical Analysis and applying a method of Backward -Stepwise Regression Elimination Technique

to determine the best multi-regression model for factors affecting the quality of education.

Table (5) shows the complete model with all possible predictors/independent variables $(X_1, X_2, X_3, X_4, \ldots X_{15})$, we notice the highest P-value (0.896) for social support effect, So we most remove social support variable from the regression model and analyze the slope again without that variable. Table (6) shows the model without social support effect, we notice the highest P-value (0.583) for the Age

effect, so we must remove the age variable from the regression model and analyze the slope again without that variable. Table (7) shows the model without age effect, we notice the highest P–value (0.115) for the medical care effect, so we most remove medical care variable from the regression model and analyze the slope again without that variable. Table (8) shows the model without the medical care effect, we notice the highest P–value (0.157) for Income level effect, so we most remove the Income level variable from the regression model and analyze the slope again without that variable.

Table (9) shows the model without Income level effect, we notice the highest P–value (0.069) for medical care effect, so we most remove medical care variable from the regression model and analyze the slope again without that variable.

Table (10) shows the model without medical care effect, we notice the highest P–value (0.077) for Technical support effect, so we most remove Technical support variable from the regression model and analyze the slope again without that variable.

Table (11): shows the pest model predictors/independent variables where all P–value < SL (0.05).

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	−0.714	0.524	− 1.361	0.176	− 1.750	0.323	−1.750	0.323
Age (x_1)	−0.052	0.086	0.603	0.547	− 0.223	0.118	−0.223	0.118
Income level (x_2)	0.116	0.075	1.558	0.121	− 0.031	0.264	−0.031	0.264
Social status (x_3)	−0.043	0.114	− 0.377	0.707	− 0.268	0.183	−0.268	0.183
Parent education (x_4)	0.320	0.072	4.415	0.000	0.177	0.463	0.177	0.463
Efficiency of the teacher (x_5)	0.068	0.013	5.138	0.000	0.042	0.094	0.042	0.094
Student self-skills (x_6)	0.025	0.010	2.594	0.010	0.006	0.044	0.006	0.044
Nature of the courses (x_7)	0.082	0.019	4.352	0.000	0.045	0.119	0.045	0.119
References (x_8)	0.026	0.011	2.430	0.016	0.005	0.048	0.005	0.048
Academic Advising (x_9)	−0.029	0.014	2.062	0.041	− 0.057	− 0.001	−0.057	−0.001
Psychological counseling (x_{10})	−0.084	0.027	3.100	0.002	− 0.138	− 0.030	−0.138	−0.030
Quality Management (x_{11})	0.058	0.024	2.389	0.018	0.010	0.105	0.010	0.105
Technical support (x_{12})	0.061	0.026	2.370	0.019	0.010	0.112	0.010	0.112
social support (x_{13})	−0.003	0.024	0.131	0.896	− 0.050	0.044	−0.050	0.044
medical care (x_{14})	−0.044	0.024	1.827	0.070	− 0.091	0.004	−0.091	0.004
Administrative leadership (x_{15})	0.047	0.016	2.849	0.005	0.014	0.079	0.014	0.079

Equation (1), Estimated regression model for all possible predictors/independent variables

$Y = -0.714 - 0.052\ X_1 + 0.116\ X_2 - 0.043\ X_3 + 0.320X_4 + 0.068X_5 + 0.025X_6 + 0.082X_7 + 0.026X_8 - 0.029X_9 - 0.084X_{10} + 0.058X_{11} + 0.061X_{12} - 0.003X_{13} - 0.044X_{14} + 0.047X_{15} \ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%

Table (6): the model predictors/independent variables without social support effect

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	-0.754	0.510	-1.477	0.142	-1.762	0.255	-1.762	0.255
Age	-0.046	0.084	-0.551	0.583	-0.213	0.120	-0.213	0.120
Income level	0.118	0.074	1.597	0.112	-0.028	0.264	-0.028	0.264
Parent education	0.319	0.072	4.431	0.000	0.177	0.461	0.177	0.461
Efficiency of the teacher	0.067	0.013	5.199	0.000	0.042	0.093	0.042	0.093
Student self-skills	0.025	0.009	2.641	0.009	0.006	0.044	0.006	0.044
Nature of the courses	0.081	0.019	4.400	0.000	0.045	0.118	0.045	0.118
References	0.027	0.011	2.483	0.014	0.005	0.048	0.005	0.048
Academic Advising	-0.029	0.014	-2.090	0.038	-0.057	-0.002	-0.057	-0.002
Psychological counseling	-0.085	0.027	-3.186	0.002	-0.138	-0.032	-0.138	-0.032
Quality Management	0.056	0.022	2.531	0.012	0.012	0.100	0.012	0.100
Technical support	0.061	0.025	2.386	0.018	0.010	0.111	0.010	0.111
medical care	-0.044	0.023	-1.888	0.061	-0.090	0.002	-0.090	0.002
Administrative leadership	0.046	0.016	2.981	0.003	0.016	0.077	0.016	0.077

Equation (2), Estimated regression model for predictors/independent variables without social support effect.

$Y= -0.754-0.046\ X_1+0.118\ X_2-0.118\ X_3+0.0.319X_4+0.067X_5+0.025X_6+0.081X_7+0.027X_8-0.029X_9-0.085X_{10}+0.056X_{11}+0.061X_{12}+0.044X_{14}+0.046X_{15}$

$\dots\dots\dots\dots\dots\dots\dots\dots\dots(2)$

	Coefficients	Standard Error	t Stat	P–value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Table (7): the model predictors/independent variables without age effect								
Intercept	−0.792	0.504	1.570	0.118	−1.789	0.205	−1.789	0.205
medical care	0.117	0.074	1.587	0.115	−0.029	0.262	−0.029	0.262
Parent education	0.321	0.072	4.484	0.000	0.180	0.463	0.180	0.463
Efficiency of the teacher	0.067	0.013	5.182	0.000	0.041	0.092	0.041	0.092
Student self–skills	0.025	0.009	2.633	0.009	0.006	0.044	0.006	0.044
Nature of the courses	0.080	0.018	4.377	0.000	0.044	0.116	0.044	0.116
References	0.027	0.011	2.566	0.011	0.006	0.048	0.006	0.048
Academic Advising	−0.029	0.014	2.068	0.040	−0.057	0.001	−0.057	−0.001
Psychological counseling	−0.085	0.027	3.194	0.002	−0.138	0.033	−0.138	−0.033
Quality Management	0.058	0.022	2.664	0.009	0.015	0.102	0.015	0.102
Technical support	0.060	0.025	2.372	0.019	0.010	0.110	0.010	0.110
Administrative leadership	0.046	0.015	2.954	0.004	0.015	0.076	0.015	0.076

Equation (3), Estimated regression model for predictors/independent variables without age effect.

$$Y = -0.792 + 0.117\,X_2 - 0.118$$
$$X_3 + 0.0.319X_4 + 0.067X_5 + 0.025X_6 + 0.081X_7 + 0.027X_8 - 0.029X_9 -$$
$$0.085X_{10} + 0.058X_{11} + 0.060X_{12} + 0.046X_{15}\ldots\ldots\ldots\ldots(3)$$

Table (8): the model predictors/independent variables without medical care effect								
	Coefficients	Standard Error	t Stat	P–value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	−0.712	0.507	−1.403	0.163	−1.715	0.291	−1.715	0.291
Income level	0.105	0.074	1.421	0.157	0.041	0.252	−0.041	0.252
Parent education	0.331	0.072	4.585	0.000	0.188	0.474	0.188	0.474
Efficiency of the teacher	0.065	0.013	5.018	0.000	0.039	0.091	0.039	0.091
Student self–skills	0.023	0.010	2.446	0.016	0.004	0.042	0.004	0.042
Nature of the courses	0.081	0.018	4.405	0.000	0.045	0.118	0.045	0.118
References	0.026	0.011	2.417	0.017	0.005	0.047	0.005	0.047
Academic Advising	−0.030	0.014	−2.141	0.034	−0.058	−0.002	−0.058	−0.002
Psychological counseling	−0.083	0.027	−3.071	0.003	−0.136	−0.029	−0.136	−0.029
Quality Management	0.045	0.021	2.149	0.033	0.004	0.087	0.004	0.087
Technical support	0.034	0.022	1.572	0.118	−0.009	0.078	−0.009	0.078
Administrative leadership	0.038	0.015	2.516	0.013	0.008	0.068	0.008	0.068

Equation (4), Estimated regression model predictors/independent variables without medical care effect

$$Y= -0.712 +0.105 X_3+0.0.331X_4+0.065X_5+0.023X_6+0.081X_7+0.026X_8-0.030X_9-0.083X_{10}+0.045X_{11}+0.034X_{12}+0.038X_{15}\dots\dots\dots\dots(4)$$

Income level

Table (9): the model predictors/independent variables without Income level effect								
	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	−0.550	0.496	−1.108	0.270	−1.530	0.431	−1.530	0.431
Parent education	0.320	0.072	4.442	0.000	0.178	0.462	0.178	0.462
Efficiency of the teacher	0.066	0.013	5.079	0.000	0.040	0.092	0.040	0.092
Student self–skills	0.024	0.010	2.466	0.015	0.005	0.042	0.005	0.042
Nature of the courses	0.082	0.019	4.438	0.000	0.046	0.119	0.046	0.119
References	0.025	0.011	2.318	0.022	0.004	0.046	0.004	0.046
Academic Advising	−0.030	0.014	−2.090	0.038	−0.058	−0.002	−0.058	−0.002
Psychological counseling	−0.085	0.027	−3.138	0.002	−0.138	−0.031	−0.138	−0.031
Quality Management	0.046	0.021	2.185	0.030	0.004	0.088	0.004	0.088
Technical support	0.039	0.022	1.781	0.077	−0.004	0.082	−0.004	0.082
Administrative leadership	0.035	0.015	2.338	0.021	0.005	0.065	0.005	0.065

Equation (5), Estimated regression model predictors/independent variables without Income level effect

$$Y= -05508 +0.0.320X_4+0.066X_5+0.024X_6+0.082X_7+0.025X_8-0.030X_9-0.085X_{10}+0.046X_{11}+0.039X_{14}+0.035X_{15}\dots\dots\dots\dots(5)$$

Table (10): the pest model predictors/independent variables								
	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	−0.365	0.489	−0.747	0.456	−1.331	0.601	−1.331	0.601
Parent education	0.321	0.073	4.430	0.000	0.178	0.465	0.178	0.465
Efficiency of the teacher	0.063	0.013	4.845	0.000	0.037	0.088	0.037	0.088
Student self-skills	0.024	0.010	2.459	0.015	0.005	0.043	0.005	0.043
Nature of the courses	0.076	0.018	4.147	0.000	0.040	0.112	0.040	0.112
References	0.029	0.011	2.758	0.007	0.008	0.050	0.008	0.050
Academic Advising	−0.032	0.014	−2.272	0.025	−0.060	0.004	−0.060	−0.004
Psychological counseling	−0.055	0.021	−2.574	0.011	−0.097	0.013	−0.097	−0.013
Quality Management	0.054	0.021	2.622	0.010	0.013	0.095	0.013	0.095
Administrative leadership	0.036	0.015	2.379	0.019	0.006	0.066	0.006	0.066

Equation (6), Estimated regression model predictors/independent variables without Technical support effect

$$Y= -0365 +0.0.321X_4+0.063X_5+0.024X_6+0.076X_7+0.029X_8-0.032X_9-0.055X_{10}+0.054X_{11}+0.036X_{15}\dots\dots\dots\dots(6)$$

Equation (6) shows the best equation for estimating the regression modelFor education quality after excluding variables

with a value of P(v) > SL (0.05). It has the most variables that affect the quality of education.

8. Discussion

The purpose of this study is to determine the effects of each of the demographic characteristics of the respondents (age, social status, physical condition, parental education) and the characteristics of the educational environment (teacher-specific characteristics, the personal skills of the student, the nature of the courses, the availability of the necessary environment for the educational process, the availability of course syllabus references, the role of academic guidance, the role of guidance and psychological guidance, the role of quality management, the role of technical support, the role of social support, medical care and finally the role of administrative leadership).

Considering all the above elements as independent factors affecting the quality of education measured by the degree of student achievement (GPA) as a dependent variable. The results showed that there is a strong correlation between these characteristics and the cumulative rate of the student (GPA) as a measure of the quality of education.

(Seginer, 1983), the results showed that the level of parental education has an impact on the cumulative rate of the student as stated.(Seginer, 1983)

Through the finding on this study, self-efficacy has no significant with academic achievement. Most of the respondent disagree that self-efficacy is one of the most factors affecting students' academic achievement. For this reason, attention should be paid to the response to the second research question. Merriman (2012) study mentioned that students need teachers who understand their unique attributes and help them to success in their studies. Consequently, the students' academic achievement is not driven by their self-efficacy.(Merriman, 2012)

She also explained that the variables of age, social status, the role of technical support and medical care have no significant impact on the level of academic achievement.

She also explained that there is a strong correlation and effective impact on the competence of the teacher, the personal skills of the student, the nature of the courses, the availability of references, the role of academic guidance, the role of psychological guidance, the role of quality management and finally the role of successful management leadership over the student's achievement (GPA)Agreed with Becker. (Merriman, 2012)

Which reflects the high quality of education at Princess Noura Bint Abdul Rahman University.

9. Conclusion and Recommendations

This study is a tool to draw the attention of educational institutions to the extent of the importance of some of the factors that occur on the quality of education, which they should be concerned with and continuous development of them. the most important of these factors explained by the study, using Backward –Stepwise Regression Elimination Technique the level of education of parents, the degree of competence of the teacher, the personal skills of the student, The nature of the courses, availability of references, the role of academic counseling, the role of psychological counseling, the role of quality management and finally the role of successful management leadership.

The full attention and priority of this variable identification process must be given so that educational institutions can develop educational strategies to ensure that all students have opportunities to reach their full potential in learning and performance. More research is needed to explore the problem on a large sample of more dispersed geographical

areas including other student factors, family factors, universty and peer factors.

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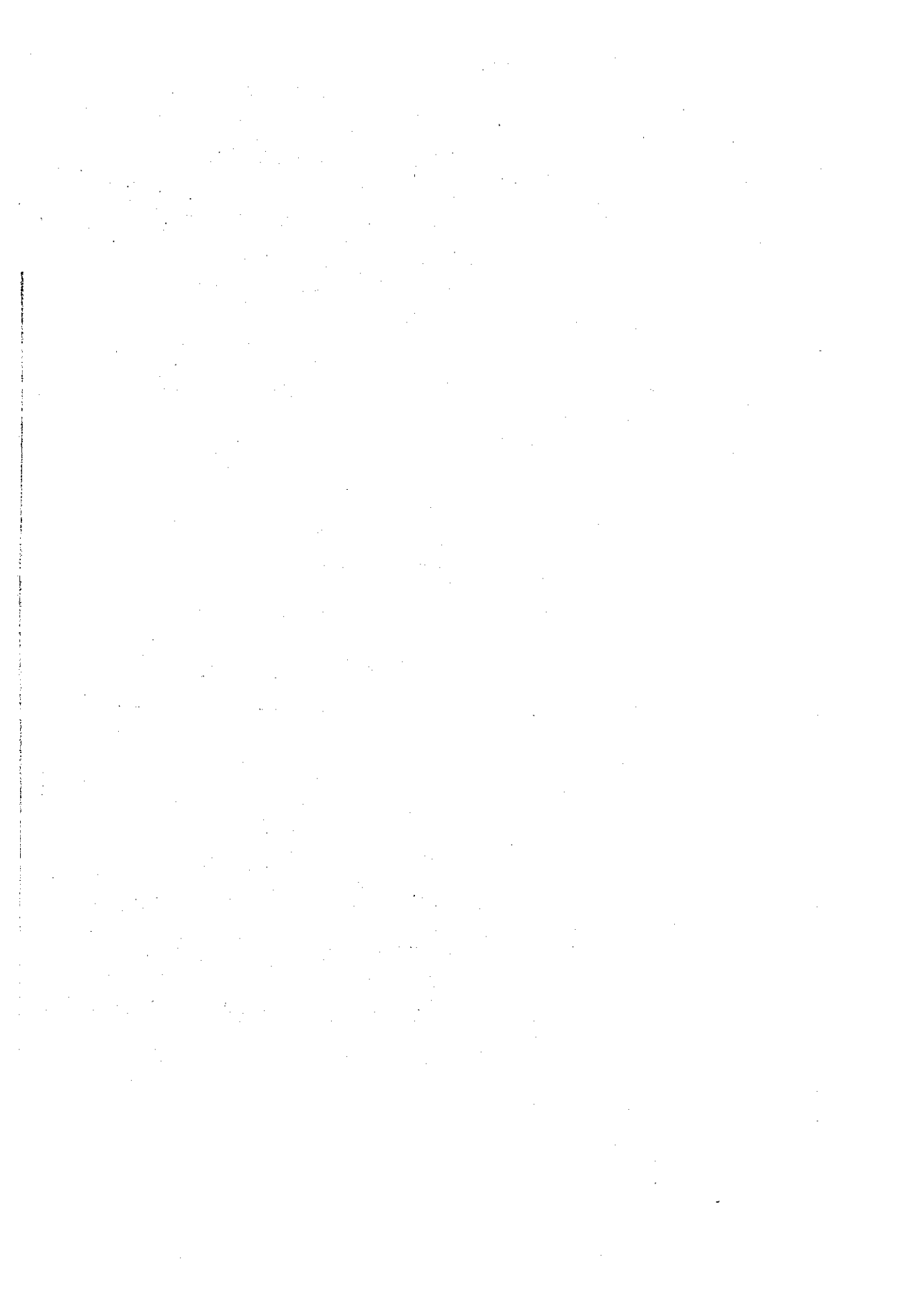
اختيار النموذج – تقنية التراجع (الانحدار التدريجي)
لدراسة العوامل المؤثرة على جودة التعليم
(دراسة تطبيقية بجامعة الأميرة نورة بنت عبدالرحمن)

كريمة احمد السيد

أستاذ مساعد بقسم إدارة الأعمال – كلية إدارة الأعمال

جامعة الأميرة نورة بنت عبدالرحمن – المملكة العربية
السعودية

مدرس بقسم الإحصاء – كلية التجارة– جامعة الأزهر

جمهوريه مصر العربية

kaali@pnu.edu.sa

٢٠١٨م-١٤٣٩هـ

ملخص الدراسة

أجريت هذه الدراسة بهدف دراسة العوامل التي تؤثر على مستوى جودة التعليم مقاسا بالمعدل التراكمى للطالب GPA لعينة عشوائية حجمها ١٦٠ من طلاب برنامج ادارة الاعمال بجامعه الاميرة نورة بنت عبد الرحمن وأجريت دراسة استقصائية باستخدام استبيان لجمع المعلومات عن مختلف العوامل المتعلقة بمستوى جودة التعليم تم تطبيق اختبار ANOVA للتحقق من مدى تأثير العوامل المختلفة على المعدل التراكمى للطلاب. وكشفت نتائج الدراسة أن العوامل الديموغرافية (العمر، الحالة الاجتماعية، الحالة المادية، تعليم الوالدين) وخصائص البيئة التعليمية (صفات خاصة بالمعلم، السمات الشخصيه للمتعلم، طبيعة المقررات الدراسية، توفر المناخ اللازم للعملية التعليمية، مدى توفر المراجع الدراسية للمقررات، دور الارشاد الاكاديمى ، دور التوجيه والارشاد النفسى، دور ادارة الجودة، دور الدعم الفنى، دور الدعم الاجتماعى، الرعاية الطبية واخيرا دور القيادة الادارية) لهم اثر فعال على مستوى جودة التعليم مقاسا بالمعدل التراكمى للطلاب

وجرى استخدام نموذج الاختيار – تقنية التراجع (الانحدار التدريجي) لتحديد اكثر هذه العوامل تأثيرا فى مستوى جودة التعليم ووجد ان مستوى تعليم الاباء ،درجه كفاءة المدرس ،المهارات الشخصية للطالب، طبيعه المقررات، مدى توفر المراجع، دور الارشاد الاكاديمى، دور الارشاد النفسى، دور ادارة الجودة واخيرا دور القيادة الادارية الناجحة هى من اكثر العوامل تأثيرا فى جودة التعليم.

الكلمات المفتاحية:

اختيار النموذج – تقنية التراجع – أسلوب التخلص من الانحدار التدريجي – جودة التعليم.

					يوجد مركز رياضى للطالبات
					يوجد مركز خدمات للطالبات
					المحور الحادى عشر: مدى توفر الرعاية الطبية
					تتوفر لدى المؤسسة وحدة للرعاية الطبية
					تتوفر وسيلة لنقل الحالات الطارئة لوحدة الرعاية الطبية
					تم اصدار بطاقة رعاية طبية لى منذ انتسابى للمؤسسة التعليمية
					احصل على الرعاية الطبية المطلوبة بشكل عاجل
					لدى ألحق بصرف الادويه والعقاقير مجانا ببطاقة الرعاية الطبيه
					المحور الثانى عشر: دور القيادة الادارية
					تتسم الادارة الحالية بالوعي التام بذاتها، وبأهداف المؤسسة التى يجب تحقيقها
					تمتلك الادارة الحالية القدرة على فهم الآخرين وإدراك بعض الجوانب الرئيسة في النفسيات البشرية والقدرة على التعامل معهم.
					تمتلك الادارة الحالية القدرة العالية في السيطرة، والسلطة الكافية للنجاح.
					تمتلك الادارة الحالية مهارات عالية في الاتصال والتواصل والتفاعل مع الآخرين بإيجابية.
					الادارة الحالية لديها القدرة على اتخاذ القرارات وتحمل المسئولية

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