

Regression Model for the Perception of Graduates on University's Reputation

A R Fadhilah, M Y Yuzainee



Abstract: Globalization and social media have made the world far more reachable than ever before. The changes have to be prepared on the technological, demographic, social, environmental, economic and political matters. This includes our educational structures. Thus, the questionnaires in the tracer survey prepared by the Ministry of Higher Education are carried out to get the perceptions and opinions of every graduating student on their experiences while they were studying in the institution. The purpose is to obtain the views and experiences on the program, facilities and services provided during the study in the institution. The feedback from graduates is important to bring any necessary changes to the strategic planning of the institution. Correlation and regression analysis are performed to determine the relationship between the components related to graduates' experiences while studying in Universiti Tenaga Nasional (UNITEN), the effectiveness of study programs and graduates' perception of the institution's reputation. The results revealed by the stepwise regression analysis that the stronger degree of the significance in terms of the contributing predictor for the graduates' perception of UNITEN's reputation starts with the effectiveness of the study program, facilities, assessment system, teaching staff, curriculum and lastly with the knowledge and skills.

Keywords: Education, Social media and University reputation

I. INTRODUCTION

The world is changing fast in which time is fluid in a knowledge culture and everything changes and is unstable. The new millennium is characterized by a series of crises such as environmental crisis and economic crisis. These current challenges as discussed in [1] give the impact to the higher education and some of the impacts include less sustainable status quo, less value of the university degree, changing needs in students and lecturers. The current required skills in the working world are knowledge, competencies and character qualities. Thus, the new students require a new learning model and a new learning experience. The innovations on academic have to adaptable to the new requirement and thus the institution has to change accordingly. The curriculum may need to be redesigned and the education system may need to be flexible.

The technology such as using the smart board in learning has the potential to change students' understanding and their skills, abilities and characteristics as found in the study made by [2]. It facilitates and improves learning by enhancing their motivation. In the twenty-first century, information and communication technologies (ICT) can effectively assist higher education to improve the ways in which knowledge can be produced, managed, disseminated, accessed and controlled as specified in [3]. It was evident through the study done by [4] that student acceptance would increase with a gradual transition towards online assessments together with the technological training for both students and faculty. However, the most important reasons for pursuing higher education are career prospects, employability status and the reputation of the university. This study was done in [5] which included as well the student's own desire for personal development that lead the student to consider the reputation of the university.

Guided by the global goals for sustainable development, many of us work together to form any model analysis to achieve any goals for a better future. Sustainability Education is often referred to as Education for Sustainable Development (ESD) and has been defined by UNESCO in 2014 as to allow every human being to acquire the knowledge, skills, attitudes and values necessary to shape a sustainable future [6]. Hierarchical regression which includes forward, backward and stepwise regression was applied for the sustainability and sustainable development in the innovative research area of the psychology by the authors in [7]. They found that emotional intelligence explained additional variance in intra preneurial self-capital beyond that accounted for each of the most often used trait personality models for Italian university students. Similarly, the hierarchical stepwise regression was applied in [8]. The authors found that the commitment and management competencies were the common contributing factors to the sustainable entrepreneurship among the east coast home stays in Malaysia. Whilst the motivation competency was the main contributing factor to the environment sustainability. A multivariate linear regression method and an adaptive neuro-fuzzy inference system were used in [9] to model the energy consumption as a function of the prominent factors such as the number of vehicles, the level of ownership and income, and fuel prices. The models predict future energy needs of the Jordanian transportation sector in order to monitor Jordan's sustainable development. The effective technology transfer was found in [10] to contribute positively to the performance and sustainability of the standard gauge railway in developing countries. This study was done based on Kenyan international students in China using hierarchical regression model.

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Multiple linear regression was also used to assess the performance of the manufacturing companies in [11]. It was found that the sustainability index regression model included a set of environmental, economic and social indicators as contributors to the evaluation of a manufacturing company's performance through quantifying measures and data.

The feedback from graduates is important to the strategic planning of the institution to attain the goals on educational sustainability. The paper by [12] concluded that how the graduate tracer studies were designed was important to obtain the appropriate intrinsic and extrinsic results. Thus, the tracer survey prepared by the Ministry of Education (MOE) in Malaysia is carried out every year to get the perceptions and opinions of every graduating student on their experiences while they were studying in the institution. It aims to acquire the views and knowledges on the program, facilities and services provided during the study. The objective of this paper is to determine the relationship between the components related to graduates' experiences while studying in Universiti Tenaga Nasional (UNITEN), the effectiveness of study programs and graduates' perception of the institution's reputation. Any significant or contributing factor based on the graduates' views on UNITEN's reputation resulting from the statistical analysis would be beneficial in formulating the appropriate strategy to attract more potential students to enroll in the university.

II. METHODOLOGY

All graduating students of Higher Learning Institutions are required to complete the online survey of the graduate tracer study prepared by MOE. The online survey was sent to all the contacts of graduates and they normally took about 30 minutes to complete the entire questionnaires in the survey. They were required to print a copy of the confirmation slip and submit it before collecting their graduation gowns for the convocation. The questionnaire consists of seven parts: (A) Profile of graduates (B) Experience during study (C) Effectiveness of the study program (D) Further studies (E) Status of the current employment (F) Employment and (G) Unemployment. However, the objective of this study is to determine the relationship between the graduates' perceptions on UNITEN against their experience during the study at the university. Thus, the hypotheses assessed are only in part (B) and (C). The questionnaires in part (B) are on (1) curriculum, (2) assessment system, (3) career guidance services, (4) teaching staff, (5) facilities and (6) knowledge and skills. Whilst in part (C), the questionnaires are on (1) effectiveness of the study program (2) perception on institutional reputation.

In the survey of part (B), respondents were requested to rate their responses to any relevant questionnaire based on the Likert-scale of 1 to 5: with scale 1 (very dissatisfied), 2 (not satisfied), 3 (moderately satisfied), 4(satisfied) and 5 (very satisfied). For the questionnaire of (1) in Part (C), respondents were requested to rate on the scale of 1 to 5: with scale 1 (very non-influential), 2 (non-influential), 3 (moderately influential), 4(influential) and 5 (very influential). But, on the perception on reputation in (2) of

part (C), the respondents were asked to rate on the scale of 1 to 5: with scale 1 (very non-excellent), 2 (non-excellent), 3 (moderately excellent), 4(excellent) and 5 (very excellent).

Regression Analysis

Besides the descriptive statistics used in the analysis of the data, the regression analysis is performed to test on the proposed hypothesis against the null hypothesis stating that all the independent or predictor variables contribute no information for the prediction of the dependent variable. These predictor variables are used to explain the variation in the dependent variable. The predictor variables are: curriculum, assessment system, career guidance services, teaching staff, facilities, knowledge and skills, effectiveness of the study program. The dependent variable is the graduates' perception on university's reputation. Since some of these predictor variables may contain shared information, a stepwise multiple regression analysis is used to select only the significant ones. The steps to follow when performing a multiple regression analysis are [13]:

- Select the predictor variables to be included in the model.
- Obtain the fitted prediction model.
- Use the analysis of variance F test and R -Square to determine how well the model fits the data.
- Check the t tests for the partial regression coefficients to see which ones are contributing significant information in the presence of the others.
- Use residual plots to check for violation of the regression assumptions.

The block diagram of the regression model, which consists of the graduates' perception on university's reputation as the dependent variable and its correlated predictor variables is illustrated in Fig. 1. The regression model obtained is expected to measure how well the model fit, how strong is the relationship between independent and dependent variables and how good are the estimates and predictions in the model.

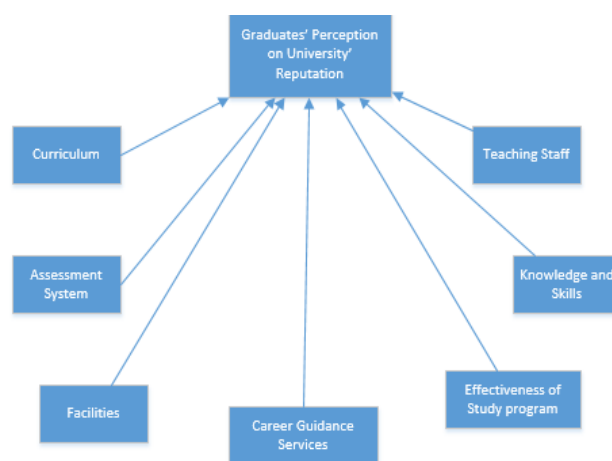


Fig. 1 Potential Contributing Variables for Graduates' Perception

III. RESULTS AND DISCUSSIONS

Hypotheses Statements

The proposed hypotheses tested under the regression analysis are [3]:

- H1: There is a relationship between curriculum and graduates’ perception on university’s reputation.
- H2: There is a relationship between assessment system and graduates’ perception on university’s reputation.
- H3: There is a relationship between career guidance services and graduates’ perception on university’s reputation.
- H4: There is a relationship between teaching staff and graduates’ perception on university’s reputation.
- H5: There is a relationship between facilities and graduates’ perception on university’s reputation.
- H6: There is a relationship between knowledge and skills, and graduates’ perception on university’s reputation.
- H7: There is a relationship between effectiveness of study program and graduates’ perception on university’s reputation.

The Sample

There are 2196 respondents consist of 1149 males and 1047 females selected from the 2017 batch of UNITEN graduating students used for analysis purposes. These students had completed either their bachelor, master or doctorate degrees in UNITEN from three different colleges: (975) college of business and accounting (COBA), (758) college of engineering (COE), (343) college of science computer and information technology (CSIT) and (120) college of graduate studies.

Descriptive Statistics

The views from the respondents on the level of satisfaction, degree of influential and reputation of each variable are presented in Fig. 2. The respondents rate the highest scale for the effectiveness of study system in influencing their life (4.31 out of scale 5). The lowest goes to the career guidance services. However, the rates for all the variables are more than 78.2% which is above the average satisfactory scale. Table 1 detailed out the variables with the measure of skewness for each to justify the normality assumption for the regression analysis. Since the measure of skewness for the average of all variables is in between -1 to +1, the normality assumption is justified. Another regression assumption to be checked for violation is shown in Fig. 3. The figure shows a relatively normal distribution plot for the graduates’ perception on UNITEN’s reputation. Thus, the regression analysis of the graduates’ perception on its potential independent variables is then conducted.

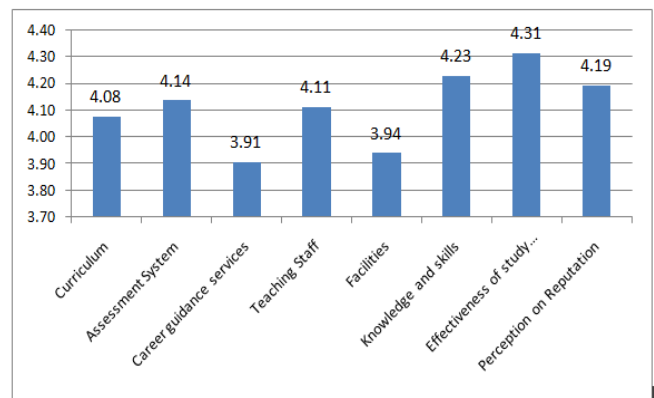


Fig. 2 Respondents towards the Measured Variables

Table. 1 Normality assessment of the independent variables [3]

	Skewness	s. e. of skewness
Curriculum		
a. Suitability of the study program		
b. Balance between theoretical and practical component		
c. Industrial attachment program/practical(if applicable)		
d. Compulsory subjects	-0.68	0.05
e. Variety of offered co-curriculum subjects		
f. Prepare learners for working world		
g. Industrial training program has benefited me in obtaining suitable employment		
Assessment System		
a. Transparent, fair and easily understood	-0.76	0.05
b. Marking schemes for assignments/tests/practical, etc.		
c. Marking schemes for examinations		
Career Guidance Services		
a. Information on job opportunities and career		
b. Guidance on interviewing skills		
c. Guidance on job application		
d. Assist in getting the job	-0.67	0.05
e. Information on further studies		
f. Job opportunities in campus		
g. External company conduct frequent job intake activities in campus		

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Teaching Staff		
a. Balance in both practical and theoretical knowledge		
b. Interaction with learners		
c. Innovative/creative in teaching/supervising		
d. Ability to relate teaching and current practices in the industry		
e. Exposure to learners on current knowledge in the field of study		
f. Delivery skills and teaching quality	-0.85	0.05
g. Provide online interaction with learners		
h. Possess adequate qualifications for teaching/supervising		
i. Communication skills in Malay language		
j. Communicate skills in English language		
k. Quality of academic advising		
l. Lecturers are normally available for consultation outside formal interaction time		
m. Academic advisors were helpful, approachable and concerned		
Facilities		
a. Library facilities and services as a whole		
b. Laboratory (computer, science), studio, kitchen, workshop etc.		
c. Lecture hall/tutorial room		
d. Sport/recreation		
e. Cafeteria/canteen		
f. Accommodation	-0.86	0.05
g. Health center /clinic		
h. Parking		
i. Campus security		
j. Online integrated learning system		
k. Campus bookstore		
l. Conducive study area		
m. ICT facilities in campus		
Knowledge and Skills		
a. Proficiency in Malay language		
b. Proficiency in English language		
c. Proficiency of language other than Malay and English language		
d. Interpersonal communication skills		
e. Creative and critical thinking skills		
f. Problem solving skills	-0.62	0.05
g. Analytical skills		
h. Ability for team work/group work		
i. Inculcate and practicing of positive values		
j. Exposure to general knowledge and current issues		
Effectiveness of Study Program		
a. Develop self confidence		
b. Enhance self-maturity		
c. Develop self-resiliency		
d. Become more knowledgeable		
e. Enhance interest in learning		
f. More sensitive towards current affairs		
g. Ability to be independent/ self-reliance	-0.78	0.05
h. Creative and critical thinking		
i. Ready to face the working world and its challenges		
j. Problem solving and decision making		
k. Team work/group working		
l. Be able to communicate more effectively		
Perception on Reputation		
a. Reputation as a renowned research institution		
b. Reputation as a renowned and quality education provider	-0.74	0.05
c. Reputation as an excellent academic institution		
d. Reputation in the field of your study		
e. General perception		

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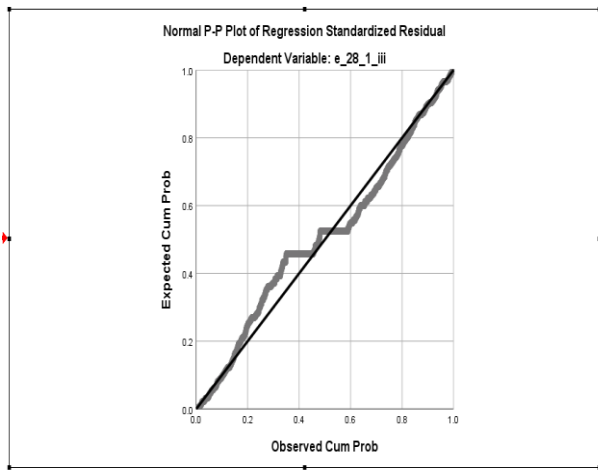


Fig. 3 Normality assumption

Regression Analysis

The correlation matrix for all the variables is displayed in Table 2. The top three highest of the good correlation between the graduates' perception on UNITEN's reputation are with the teaching staff (0.572), then followed by the effectiveness of the study program (0.568) and assessment system (0.557). The rest are fairly correlated with one

another from 0.361 up to a good correlation of 0.595. The coefficient of determination, R-square value of 0.504, revealed as a good percentage of variation in the graduates' perception been explained by its potential predictors. The figures of 0.75, 0.50, or 0.25 were considered as under substantial, moderate or weak category for the goodness of fit by the authors in [14]. The analysis of variance F test as shown in Table 3 shows that the regression model fits the data adequately well at $p < 0.01$ based on the regression analysis.

Table 4 depicts the results of the final regression model. Since a stepwise regression analysis fits a variety of models to the data, entering and removing any predictor variables as their contributing effect in the presence of the others is either significant or non significant, respectively [13]. An examination of the t -values of -2 to $+2$ indicates that all the predictors contribute significantly to the graduates' perception on UNITEN's reputation except for the career guidance services. The career guidance services did not satisfy the selection criteria since it indicates a non significant t -value ($p > 0.05$). Thus only the hypothesis statement in H3 gave the non significant result.

Table. 2 Correlation matrix for all variables

	Perception on reputation	Curriculum	Assessment system	Career guidance services	Teaching staff	Facilities	Knowledge and skills	Effectiveness of study program
Perception on reputation	1.000	0.523	0.557	0.488	0.572	0.535	0.463	0.568
Curriculum	0.523	1.000	0.607	0.504	0.591	0.506	0.413	0.428
Assessment system	0.557	0.607	1.000	0.595	0.647	0.554	0.414	0.454
Career guidance services	0.488	0.504	0.595	1.000	0.574	0.546	0.361	0.452
Teaching staff	0.572	0.591	0.647	0.574	1.000	0.601	0.442	0.491
Facilities	0.535	0.506	0.554	0.546	0.601	1.000	0.400	0.416
Knowledge and skills	0.463	0.413	0.414	0.361	0.442	0.400	1.000	0.509
Effectiveness of study program	0.568	0.428	0.454	0.452	0.491	0.416	0.509	1.000

Table. 3 Analysis of variance

	Sum of Squares	df	Mean square	F	Sig. (p -value)
Regression	578.588	6	96.431	356.488	0.000
Residual	569.681	2106	0.271		
Total	1148.269	2112			

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Table. 4 Regression coefficients of graduates' perception on UNITEN's reputation

Model	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	0.402	0.087		4.634	0.000
Effectiveness of study program	0.270	0.019	0.270	13.996	0.000
Knowledge and skills	0.099	0.021	0.091	4.819	0.000
Facilities	0.149	0.019	0.163	8.011	0.000
Teaching staff	0.135	0.023	0.136	5.896	0.000
Assessment System	0.138	0.021	0.146	6.554	0.000
Curriculum	0.119	0.021	0.118	5.654	0.000

The hypotheses statements H1, H2, H4, H5, H6 and H7 are supported by the results as significant. There is a significant relationship between the independent variables stated in their hypothesis to the graduates' perception on UNITEN's reputation. These independent variables are discussed based on their strongest degree in contributing to the graduates' perception which starts from the effectiveness of the study program, facilities, assessment system, teaching staff, curriculum and ends with the knowledge and skills. Each variable is focused mainly on its significant components correspondingly as stated in Table 1.

Effectiveness of the Study Program

Effectiveness of the study program is the first stronger predictor for the graduates 'perception on UNITEN reputation since its coefficient is the highest (0.27) with the highest *t*-value (13.996). Among its components that contribute significantly (*t* > 2.5) are the impact of the study program in UNITEN to the graduates' life towards their readiness to face the working world and its challenges, enhance their interest in learning, become more sensitive towards current affairs, become more knowledgeable and ability for a team work.

Facilities

Facilities variable is the second stronger predictor for the graduates 'perception on UNITEN reputation since its coefficient is 0.149 with the *t*-value of 8.011. The components under facilities which contribute the significance are the lecture hall/tutorial room, library facility and services as a whole and ICT facilities in campus. UNITEN creates exceptional student environment through world-class facilities, holistic digital environment and intellectually vibrant community to improve students learning outcomes [15]. Modern academic facilities are also designed to maximize interactions among students and lecturers. Some of the facilities available in UNITEN are Olympic-size swimming pool, gymnasium, mini stadium, sports arena which has 11 indoor courts, 3,000 capacity-multi-purpose hall and many more to enhance the learning environment and to provide welfare for its students.

Assessment System

Assessment system is the third stronger predictor for the graduates 'perception on UNITEN reputation. All the three components under the assessment system contribute the perception significantly (*t* > 2.5). The graduates are satisfied with the transparent, fair and easily understood assessment system, and with the marking schemes for examinations, assignments, test, practical and other assessments. Tools used for the assessment system in the graduating student

survey follow the outcome-based education (OBE) implementation framework which is administered by Malaysian Qualifications Agency (MQA).

Teaching Staff

Teaching staff is the next stronger predictor for the graduates 'perception on UNITEN reputation. Among the components in teaching staff that contribute significantly (*t* > 2.5) are the communication skills in English language, the delivery skills and teaching quality, balance in both practical and theoretical knowledge and ability to give updates to students on current knowledge in the field of study. Besides these components, the teaching staff are already moving forward to enhance accessibility of higher education via accredited life-long learning and blended learning, inculcate values via accredited experiential learning and community engagement.

Curriculum

Curriculum is the next stronger predictor for the graduates 'perception on UNITEN reputation. The satisfied or significant components are the suitability of the study program, preparing learners for the working world, compulsory subjects (required by the university), industrial attachment program, and variety of offered co-curriculum subjects. Due to the world challenges in 21st century where the impact is on the changing needs in students, the curriculum needs to be redesigned to address the following: : balanced with character and values , global mindset, intercultural-competency (unity in diversity), five components include critical thinking, creativity, communication , collaboration, change and challenge [1]

Knowledge and Skills

Knowledge and skills is the least significant predictor for the graduates 'perception on UNITEN reputation in the presence of other predictors. However, the regression of only the knowledge and skills on the graduates' perception on the university perception shows that there are two significant components which are strongly satisfied. The first one is the inculcation and practicing of positive values and the second one is the interpersonal communication skills. Since technology such as mobile learning apps, online learning, can provide convenience and flexibility, students are expected to get more on this. The study in [2] showed that technology has the potential to change students' understanding and their skills, abilities and characteristics. In fact, the online education becomes a disruptive challenge for which colleges are ill-prepared [16].



IV. CONCLUSIONS

Everyone is trying to make sure that the global goals for sustainability development are met to get a better future for all. One of the targets is to ensure that all learners acquire the quality education for sustainable development and global citizenship. Thus, these learners are expected to pursue their higher education and one of the most important reasons for pursuing higher education is the reputation of the university. As such, a graduate tracer study was conducted to get the perceptions of every graduating student on their experiences while they were studying in the university. The statistical analysis method of stepwise regression allows us to confidently determine which factors are significant most, which factors can be omitted, and how these factors influence each other. The bivariate correlation analysis showed that the top three highest of the good correlation between the graduates' perception on UNITEN's reputation are with the teaching staff, then followed by the effectiveness of the study program and the assessment system. These three factors are related to one another towards the graduates' satisfaction level in learning. However, the results revealed by the stepwise regression analysis performed on each component in the presence of other components that the most significant contributing predictor for the graduates' perception on UNITEN's reputation was the effectiveness of the study program and then followed by the facilities, assessment system, teaching staff, curriculum and the least is on the knowledge and skills. These factors contribute about 50% of the variation in the graduates' perception. Many efforts have been taken already to improve the graduates' perception on UNITEN's reputation in future and new factors may perhaps need to be considered too to explain more the variation in the regression analysis.

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