
A Logistic Regression Analysis on the Probability of Passing the National Certificate Examination in Polytechnic University of the Philippines – Parañaque Campus

EDCON B. BACCAY
CATHERINE R. LLAVE
MECMACK NARTEA
JEFFERSON SERRANO
CORAZON DAZA
CAPLE JUN LIPA

Polytechnic University of the Philippines
Parañaque Campus

Abstract:

This study determines the probability of Polytechnic University of the Philippines – Paranaque City Campus to pass the National Certificate Examination based on their Demographic Profile and the factors given such as; Professors Teaching Method, Study Habit of the Students, Study Environment, Time management, and Emotions of the students, who took the examination as a pre-requisite for graduation. The National Certificate Examination is an examination conducted by the Technical Education and Skills Development Authority (TESDA) as one of the determinants in the continuing education of students.

The study used descriptive survey method to answer the statement of the problem in a satisfactory manner. Two hundred Six (206) samples are randomly selected for the study.

Using the Logistic Regression, the researchers find out that the Age, Study Habit, Study Environment, and the

Emotions of the students are contributory to the probability of passing the National Certificate Examination.

Key words: national certificate examination, logistic regression, odds ratio, demographic profile, selected factors

INTRODUCTION

“With the high unemployment rate, particularly among our youth, the onus is on the government to ensure access to quality tech–voc through competent trainers and relevant programs” stated by Secretary Joel Villanueva, Director General of Technical Education and Skills Development Authority (TESDA) (2014,eTESDA PMU)

As an arm to the government’s mandate of providing employment to free the people from poverty (Article 2 Section 9, 1987 Constitution), the PUP-Paranaque Campus has included the National Certificate Examination conducted by Technical Education and Skills Development Authority (TESDA) as one of the determinants in providing quality and highly competitive education for students. Last 2015, the said campus has adopted this examination as part of its curriculum for the first year and second year students. All students under the diploma program are required to have a passing mark on the National Certificate Examination (NC or NCE) for them to demonstrate competency in their field and to show preparedness in their future work.

Given the originality of this adaptation, a number of factors may affect the increase or decrease in the percentage of students who pass the said NCE. Generally speaking, students who take national examinations are cautiously preparing for that big day. However, it may not be incumbent upon all students that intrinsic behaviors are the only elements in this

situation. A number of factors may also be attributed such as competency of the trainers, the preparations provided by the school and the relevance to its programs and curriculum and others.

Hence, this study aims to determine whether the instructor, the campus' curriculum and even the students themselves have adequately prepared the test-takers – the students of PUP-Parañaque City Campus under Diploma Program AY 2015-2016 – for the National Certification Examination program of TESDA.

OBJECTIVES OF THE STUDY

The study aims to determine the probable factors affecting the passing in the National Certificate Examination and develop a model in predicting factors affecting the passing of national certification exams. Lastly, to determine which age/ages and gender have higher probability of passing the NCE.

RESEARCH PARADIGM

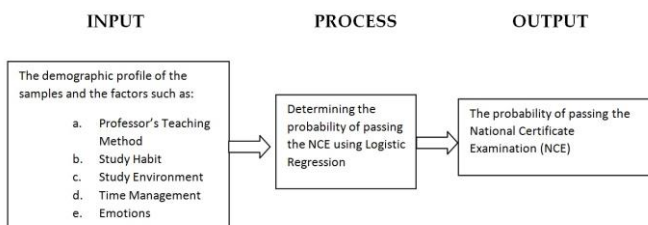


Figure 1. Research Paradigm

The input variables for this study are the professor's teaching method, study habit, study environment, time management and emotions which will undergo logistic regression thereby

yielding probable factors that affect the passing in the National Certificate Examination.

STATEMENT OF THE PROBLEM

The study specifically answers the following:

1. What is the demographic profile of the students in terms of:
 - 1.1. Age
 - 1.2. Gender
2. What are the factors affecting the National Certificate Examination result?
3. What is the probability model of passing the National Certificate Examination?
4. What is the odd ratio of the different ages in passing the national certificate exams?

SCOPE AND LIMITATIONS

This study surveyed only diploma students AY 2015-2016 in PUP-Paranaque Campus which covers their demographic profile specifically age and sex.

REVIEW OF RELATED STUDIES

Foreign Studies

The following studies which are associated with the present research are mostly connected with the medical field.

Miro (2014) in her study entitled “Predictors of Success on the Prosthetics Certification Examination” found out that only credential extension has a significant role in passing the prosthetics certification exam. Credential extension is defined as whether the candidate has either the CP or CO designation.

In a study done by Breitbach, Downey and Frager (2013), they observed that candidates who experienced

academic worry, emotion-focused coping mechanisms and an external locus of control have lower chances of passing the Board of Certification (BOC) examination necessary to obtain the Certified Athletic Trainer (ATC). The respondents of this study were students from an athletic training education. This present study is not concerned with locus of control and emotion-focused coping mechanism. Also this study uses logistic regression to determine the factors that affect a national examination.

In another study done by Taylor (2012), she employed survey, interview and observation in determining the factors perceived by the respondents in the nursing program and on the national nursing licensure examination. In her research, she noted that faculty-student relationships and support from peer nursing students are factors that greatly affect the success in the nursing licensure. On a personal level, internal motivation in finishing the nursing degree and having a strong support system contribute to the success in their field.

In another study on the success on the nursing licensure examination or the NCLEX-RN, Nacos-burdts (2010) compared the demographic profile and academic characteristics with passing in the NCLEX-RN using logistic regression. She found out that the campus where the students is enrolled, the age group, the number of PN Terms attempted, anatomy and physiology GPA, PN Core Nursing GPA, number of ADN terms attempted are contributing factors to the success in NCLEX-RN first attempt test-taking.

Another medical field that used logistic regression more specifically the final multivariable logistic regression model is the paramedic field. In this study, Fernandez, A. R., Studnek, J. R. & Margolis, G. S. (2008) concluded that national program accreditation, lead instructor qualifications, student educational background and student demographics contribute

significantly to attaining the passing mark in the national paramedic certification.

The similarities of this present study to Taylor (2012), Nacos-burds (2010) and Fernandez, A. R., Studnek, J. R. & Margolis, G. S. (2008) are the studies used logistic regression, the demographic profile and the respondents are first time-takers of national licensure examination. But respondents in this study are not from the medical field but students from the diploma courses in computer engineering, information technology and office managements.

Local Study

The dearth of local study constrained the researchers in looking for related topics.

METHODOLOGY

Research Design

The study used a descriptive quantitative research design which aims to describe an existing phenomena, situation or event without influencing the variable under study. This study aims to discover the factors affecting the passing of NC through a survey. The results of the survey will create a numerical description of the frequency on the occurrence of the variables.

Population and Sample

The researchers used simple random sampling wherein the respondents of 428 were encoded in an excel file and using the formula RANDBETWEEN the sample of 206 were taken under the three diploma programs (i.e. DICT, DCET, DOMT). The 206 respondents were derived using the Slovin's Formula.

$$n = N / (1 + Ne^2)$$

where:

n = sample size

N = total population

e = margin of error

The margin of error (e) used in this study is .05. Below is the table that shows the distribution of the respondents.

Table 1. Distribution of Samples

Distribution of Samples	Frequency	Percentage
Diploma in Office Management and Technology	129	62.62%
Diploma in Information and Communication Technology	40	19.42%
Diploma in Computer Engineering and Technology	37	17.96%
Total	206	100%

Table 1 shows the distribution of the respondents from each diploma programs wherein there are 129 respondents for Diploma in Office Management and Technology, 40 respondents for Diploma in Information and Communication Technology and 37 respondents for Diploma in Computer Engineering and Technology. A total of 206 students took the national certificate examination.

Research Instrument

The instrument used to gather data was survey questionnaire wherein the questionnaire was given to the randomly chosen 206 participants.

Data Gathering Procedure

The copies of the questionnaire were distributed to the respondents inside the school campus and were also retrieved

on the same day. After, the results were then collated and tallied.

Statistical Treatment of Data

The paper used logistic regression analysis to determine the probability of passing the NC. Thus, this study used the formula below.

$$P(y|x_1, x_2, x_3, x_4) = \frac{\exp(\beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4)}{1 + \exp(\beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4)}$$

where y stands for the score/ grade/ remark on the national certification which is the dependent variable while X_1 to X_n are the independent variables. The independent variables in this study are ‘Professor’s Teaching Method’, ‘Students’ Study Habit’, ‘Students’ Study Environment’, and ‘Students’ Time Management.’

To calculate the odd ratio of gender and age the following formula was used

$$\text{odds} = \exp(\beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \dots \beta_n x_n)$$
$$\text{odds ratio} = \frac{\text{odds}(1)}{\text{odds}(2)}$$

RESULTS AND DISCUSSION

The following are the results of the survey done.

1. What is the demographic profile of the students in terms of:

1.1 Age

Table 2. Distribution of Respondents by Age

Age Interval	Frequency	Percentage
16-18	95	46.12%
19-21	101	49.03%
22-24	10	4.85%
TOTAL	206	100%

Table 2 presents the different age groups and their corresponding frequencies. The age group which has the highest number of respondents is 19-21 with 101 or 49.03%. This means that the respondents were mostly from the second year.

1.2 Gender

Table 3. Distribution of Respondents by Gender

Gender	Frequency	Percentage
Male	83	40.29%
Female	123	59.71%
TOTAL	206	100%

Table 3 shows that Male is composed of 83 students with 40.29% and Female has 123 with 59.71 % which means that female students dominate the PUP-Parañaque Campus.

2. What are the factors affecting the National Certificate Examination result?

Table 4: Factors Affecting the Passing of the National Certificate Examination

Variables	p-value	Verbal Interpretation
Gender	0.383	Not Significant
Age	0.002	Significant
Teaching Methods of the Professor	0.302	Not Significant
Study Habit of the Students	0.001	Significant

Study Environment of the Students	0.003	Significant
Time Management of the Students	0.73	Not Significant
Emotions of the Students	0.039	Significant

Table 4 shows that age, study habit of the students, study environment of the students, and the emotion of the students are the only factors that affect the passing in the national certificate examination.

3. What is the best probability model of passing the National Certificate Examination?

Below is the derived probability model of passing the National Certificate Examination.

$$P(y|x_1, x_2, x_3, x_4) = \frac{\exp(14.311409223 + -0.419829382x_{age} - 1.380423632x_{Study Habits} + -1.396517366x_{Environment} + 0.834901260x_{Emotions})}{1 + \exp(14.311409223 + -0.419829382x_{age} - 1.380423632x_{Study Habits} + -1.396517366x_{Environment} + 0.834901260x_{Emotions})}$$

4. What is the odd ratio in passing the National Certificate Examination in terms of

4.1 age?

The odd ratio of a 16-year old passing the NC is 3487.37 against a 21-year old with 0.045 which means that a 16-year old student who is fresh from high school can easily pass a national certificate exam.

4.2 gender?

Since the findings yielded a Not Significant result, the researchers did not calculate the odd ratio for the said variable.

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

Summary of Findings

Description of the Study

This study is quantitative descriptive in nature which aims to describe an existing condition by describing the generated figures in terms of aspects involved. The respondents were chosen using Slovin's Formula hence random sampling was used in this study which was focused only in PUP-Paranaque Campus AY 2015-2016.

Demographic Profile of Respondents

The survey showed in PUP-Paranaque majority of the students lie in the age bracket of 19-21 followed by 16-18 and lastly is 22-24. While, in terms of gender, female students outnumber male students.

CONCLUSIONS

1. The results yielded that age, study habit, study environment, and emotions contribute to the passing of students in the national certificate.
2. The younger test taker for national certificate has a greater chance of passing the test.
3. Gender cannot determine the chances of passing the national certification.

Recommendations

1. It is recommended that fresh high school graduates to take the national certification exam.

2. To produce a desirable mark in the national certification, the test takers should enhance their study habits and monitor their psychological condition.
3. It is further recommended to study/ learn in an environment conducive for the test takers.
4. For future researchers to consider other factors not included in this study.

ACKNOWLEDGEMENT

This research consumed huge amount of work and dedication. Still, it would not have been possible if we did not have a support of many individuals and organizations. Therefore we would like to extend our sincere gratitude to all of them.

First of all we are thankful to Polytechnic University of the Philippines – Parañaque Campus for provision of expertise, and technical support in this research. Without their superior knowledge and experience, this paper would lack in quality outcomes, and thus their support has been essential.

We are also grateful to the Diploma in Legal Office Management Batch 2015 for their cooperation.

We would like to express our sincere thanks towards researchers who devoted their time and knowledge in the completion of this study.

Nevertheless, we express our gratitude toward our families and colleagues for their kind cooperation and encouragement which help us in completion of this paper.

Most importantly, we are grateful to the God for the good health and welfare that were essential to finish this study.

REFERENCES

1. 1987 Philippine Constitution. Section 9, Article II.
2. Breitbach AP, Downey DL, Frager AJ. (2013, January-June). “The Relationship Between Candidate

- Psychological Factors and First-Attempt Pass Rate on the Board of Certification Examination”. *Athletic Training Education Journal*, 8 (1-2), 10–16. DOI:10.4085/08010210
3. eTESDA PMU. 2014, January 6). TESDA churns out 860,000 certified specialists in 2013. Received from e-tesda.gov.ph/mod/forum/discuss.php?d=943
 4. Fernandez, A. R., Studnek, J. R. & Margolis, G. S. (2008). Estimating the Probability of Passing the National Paramedic Certification Examination. DOI; 10.1111/j.1553-2712.2008.00062.x
 5. Miro, R. M. (2014). "Predictors of Success on the Prosthetics Certification Examination" *Graduate Theses and Dissertations*. Retrieved from <http://scholarcommons.usf.edu/etd/5076>
 6. Nacos-burds, Kathleen Johanna, "A comparative analysis of demographic and academic characteristics" (2010). *Graduate Theses and Dissertations*. Paper 11639. Iowa State University. Retrieved from lib.dr.iastate.edu/cgi/viewcontent.cgi?article=2625&context=etd
 7. Taylor, S. (2012). A Case Study of Factors Leading to Student Success in an Accelerated Licensed Practical Nurse to Associate Degree Nursing Program. Retrieved from eric.ed.gov/?q=APN&PE=2&id=ED549318.