ABSTRACT

This paper presents an analysis of roughness of the performance of the Teacher Education Institutions (TEIs) in the Philippines in the August 2014 Licensure Examination for Teachers (LET). The scores in the 2014 LET of the TEIs in the Philippines exhibit roughness based on the results of the histograms and the fractal spectra. The histograms show that the behavior of the scores of the takers in the elementary and secondary levels are more or less the same as they bend more on the lower scores. A comparison between the two sets of scores revealed that examinees in the elementary level performed better than the secondary level. The fractal spectral analyses affirm that there is greater variability in the higher scores and uniformity in the lower scores. The fractal spectra show the heavy-tailed processes of the fractal dimensions that indicate self-similarity properties of the percentage of scores both in the elementary and secondary levels. Self-similarity property of the 2014 LET scores is evident in the lower scores, and the behavior is consistent to both the elementary and secondary levels in the 2014 LET performance of schools. The variations in the performance of the TEIs in the 2014 LET can be attributed to some factors inherent to the schools' characteristics like the selection, admission, and retention policies and accreditation status.

Keywords: Licensure Examination for Teachers (LET), Teacher Education Institutions (TEIs), Roughness, Probability Distribution, Variations.

INTRODUCTION

The quality of performance of the colleges and universities in the Philippines is always grounded on facts and figures. One tangible measure commonly used in the country is the performance of Higher Education Institution's (HEI's) graduates in state licensure examinations (Padua, 2003). The Licensure Examination for Teachers (LET) was put in place through Republic Act No. 7836, also known as the Philippine Teachers Professionalization Act of 1994. This was enacted to highlight the role of teachers in the building and development of the nation through its responsible and literate citizens. Also, the act moves for “professionalization that will improve the quality of teachers, quality of teaching and, therefore, quality of students”. As a matter of fact, Pachejo & Allaga (2010) pointed out that the success of an institution is measured through its graduates who manifest preparedness, training, and display skills, knowledge, habits, and values necessary as they integrate themselves to society and to their respective world of work.

A 5-year study (2009-2013) on the LET performance of Teacher Education Institutions (TEIs) by the Philippine Business for Education (Malipot, 2014) showed alarming figures and
statistics. The study revealed that of the 100 enrollees in teacher education in the Philippines, only 16 will graduate; only 16 percent of the retakers make it in the examination; and only 10 percent at the elementary level and 12 percent at the secondary level of the TEIs are considered “good performing”.

The low turnout of the test results presents a scenario that the LET can be a difficult examination. On the other hand, the results also project a picture of the quality of the teachers produced by the TEIs in the country. Padua et al. (1994) has pointed that “teacher education programs get the less able students while the more able ones or who are attracted to higher pay, seek admission to other degree programs like Engineering and Medicine.”

This paper presents an analysis of the roughness of the 2014 LET results in the elementary and secondary levels in the Philippines. It will show how the performance of the Teacher Education Institutions (TEIs) in the Philippines varies as revealed in the histograms and the fractal spectra. The variables include the overall performance of the TEIs in the August 2014 LET Performance of Schools obtained by the one thousand one hundred thirty-one (1,131) institutions offering Bachelor of Elementary Education programs and one thousand three hundred eighty-eight (1,388) schools offering Bachelor of Secondary Education programs.

Fractals are the latest development in statistics (Selvam, n.d.). A fractal is a never-ending pattern that repeats itself at different scales. This property is called “Self-Similarity.” A fractal is a picture that tells the story of the process that created it (www.FractalFoundation.org).

Using fractal statistics in analyzing the 2014 LET Performance of Schools in the Philippines will be instrumental in unraveling issues hounding the performance of the TEIs in the country in the LET. The self-similarity properties of the scores will also be presented in the histograms.

**METHODOLOGY**

The data in this study were taken from the results of the 2014 LET Performance of Schools posted in the Professional Regulations Commission (PRC) website. Specifically, these are the percentage scores of the one thousand one hundred thirty-one (1,131) institutions in the Philippines offering Bachelor of Elementary Education and one thousand three hundred eighty-eight (1,388) schools offering Bachelor of Secondary Education. Histograms and fractal spectra of the data were used to illustrate roughness of performance of the TEIs in the 2014 LET examination using the Minitab software. Fractal spectrum analysis, on the other hand, was used to identify the self-similarity characteristics of the scores among the TEIs in the August 2014 LET.

**RESULTS**

**Histogram**

Figures 1 and 2 below present the histograms of the data obtained from the Minitab software. The histograms show that the percentage scores of the TEIs in the Philippines in the 2014 Licensure Examination for Teachers tend to bend more on the lower scores. With a cut-off requirement of 75 percent for a taker to pass the examination, the histograms reveal that many of the takers among the participating TEIs did not make it in the examination. It can also be observed from the graph that the scores of the TEIs in the elementary level appear most frequent within 10 to 60 percent, while, in the secondary level scores appear most frequent within 10 percent to 50 percent.
Fractal Spectrum Analysis

Figures 3 and 4 below present the fractal spectra of the data. A fractal analysis of the scores was undertaken to identify possible causes for the observed fractality or roughness in the percentage of scores in the 2014 LET performance of schools. The fractal spectra show a monotone decreasing function. They mean that as the scales increase, the fractal dimensions decrease. High fractal dimensions or the portions with heavy converging dots are noted at the lower scales. They show the heavy-tailed processes of the fractal dimensions indicating a self-similarity property in the lower scores of the 2014 LET. The behavior is seen true to both the elementary and secondary levels.

DISCUSSION

Results of the August 2014 LET Performance of Schools subjected to the test of fractality exhibit roughness as revealed in the histograms and the fractal spectra. The histograms show that majority of the examinees of the participating TEIs in the 2014 LET register scores lower than the passing requirement of 75 percent per taker. The results project the scenario that LET is a difficult examination. On the other hand, they also mean that TEIs failed to provide the appropriate formation opportunities to their graduate. The findings are consistent with the perpetual problem of declining performance of TEIs in the country. Buendia et al. (2011) propounded that “performance of graduates in the different licensure and board examinations has declined in the last ten years. The overall passing rates are quite low (around 36% on the average). Private non-sectarian institutions show the poorest results in the professional board examinations. While some “elite” institutions have consistent passing rates of over 90%, close to 300 HEIs have zero passing rates for some disciplines.” Malipot (2014) added that many of the TEIs continue to deteriorate; in fact, of these Teacher Education Institutions (TEIs), only 10 percent for elementary and 12 percent for secondary are
considered “good performing.”

As shown in the behavior of the scores in the elementary and secondary levels, the takers at the elementary level performed better than those at the secondary level. This observation is supported by the findings of the Philippine Business for Education’s (PBED) study which states that “the national passing rate for first-time takers and repeaters in elementary education improved in 2014 as compared to the combined average from 2009 to 2013, but slightly deteriorated for secondary education” (Aquino, 2015). Pascua & Navalta (2011) added that “BEEd performed better than the BSEd and all other courses combined (BSMath, BSAExt, BSHT, BSIE, BSAEd).”

In a review of the Top Performing Schools in the 2014 LET and PBEd’s list of best and the worst teacher education schools published on the PRC website, schools classified as “top performing TEIs for elementary and secondary education are those which have a passing rate of more than 80 percent, from 2009 to 2014” (Aquino, 2015). It can be implied from the data that it was the same group of schools which consistently performed "good" or "best" in the LET and the others were either "worse" or "worst". The implication is further substantiated by the self-similarity characteristics of the data as revealed in the histograms and the fractal spectra.

Upon examining the high performing TEIs, certain factors can be inferred. These factors are selective admission and retention policy and accreditation of programs. In fact, Faltado (2014) noted that “admission and retention policy, curriculum and instruction and faculty competence are significantly correlated with the teacher education program performance in the licensure examination.” Selection and recruitment processes are necessary if TEIs want to produce quality results in the LET. Harman (1994) posits that effective student selection is important in any higher education system because the quality of students affects the quality and internal efficiency of the educational program offered. With the reality that higher education in the Philippines grapples with quality, selectivity in admission should ensure that an increase in enrollment is related to instructional capacity and not on mere money making. In the Philippines, students who wish to become teachers have the wide array of schools to choose from because of the proliferation of not less than 1,280 colleges and universities with many operating in mediocrity. According to Corpus (2003), the country is experiencing the phenomenon of mass education along with "the concomitant rise of universities and colleges (public and private) offering a greater diversity of programs". Mass education continues even if LET results have shown that many of the existing TEIs failed to equip their graduates with the knowledge, skills, and experiences required of them to become effective and efficient teachers.

To ensure that higher education institutions operate with excellent academic programs, manpower and financial capability, and efficient delivery system, the government through the Commission on Higher Education created a scheme of quality assurance to colleges and universities in the Philippines through voluntary accreditation. Accreditation is "viewed as a process by which an institution at the tertiary level evaluates its educational activities, in whole or in part, and seeks an independent judgment to confirm that it substantially achieves its objectives, and is generally equal in quality to comparable institutions" (Accrediting Association of Chartered Colleges and Universities of the Philippines - AACCUP, 2014). Accreditation helps institutions possess quality standards and pushes them to remit quality standards at high levels. It makes everyone engaged in education to be aware, to strive, and to perform within the standards of excellence. It makes an institution aware of their strengths and weaknesses and to work for aspects
that need to be developed. Accreditation serves a lot of benefits in administrative decision-making such that it is used as a criterion for the selection of schools catering to foreign students, preparation of budgetary requests, and as a factor in the selection of Center of Excellence (COEs) and Center of Development (CODs). Accreditation takes into account all aspects of the institution’s existence from the quality of administration, faculty line-up, facilities, student services, research, extension, linkages and other functions of a higher education institution. Accreditation is now viewed as a means of promoting educational excellence through self-regulation and peer evaluation (CHED Accreditation in the Philippines). The process of accreditation blends all components of an institution’s operation into a hallmark of quality, thus, producing outputs that are reflected in the performance of schools in the LET.

CONCLUSION

Scores in the August 2014 Licensure Examination for Teachers (LET) of the Teacher Education Institutions (TEIs) in the Philippines exhibit roughness as shown in the histograms and the fractal spectra. This is supported by the probability distributions shown in the histograms. The histograms reveal that the behavior of the scores of the examinees in the elementary level and the secondary level are more or less the same as the sets of scores bend more on the lower scores. When two sets of scores were compared, data revealed that examinees in the elementary level performed better than those at the secondary level.

The fractal spectra analyses affirm that there is greater variability in the higher scores and uniformity in the lower scores. They show the heavy-tailed processes of the fractal dimensions that indicate self-similarity properties of the percentage of the low scores both in the elementary and secondary levels. The variations in the performance of the TEIs in the 2014 LET can be attributed to some factors inherent to the schools’ characteristics like the selection, admission, and retention policies and accreditation status.

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