FRACTAL ANALYSIS ON THE PERFORMANCE OF STUDENTS IN ENGLISH LANGUAGE USING COMPUTER-AIDED LANGUAGE LEARNING AND DYNED SOFTWARE

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ABSTRACT

This paper analysis the performance of students in English Language by the use of the Computer-Aided Language Learning and DynEd Software through fractal statistics. Employing the placement test results (pretest and post-test) of the students in JEEP Start Course (English Language) taken from the Records Manager of DynEd Software, the study discovered that the logarithm of students' performance, particularly in the post-test result of their English Language has departed from its fractality. The absence of the data from its natural state implies the occurrences of hidden dimensions in this study. With its fractal dimension of 1.72490, thus, two hidden dimensions were recognized viz. CALL method and DynEd Software are efficient in helping students to enhance their English Language proficiency. However, DynED software is far more effective when it is applied to students with average levels in English language. Therefore, in order for the DynEd software to have an optimum impact, students with average levels in English language will only be enrolled in the JEEP Start Course, however, two (2) hours laboratory use of the Dyned software will be integrated to Speech and Oral Communication Subject for the benefit of the studentry in general.

Keywords: English language, computer-aided language learning, DynED software, fractal analysis

Introduction

English Language proficiency has been considered as one of the prevailing problems faced by the Higher Education Institutions in the Philippines, particularly in Mindanao. In fact, most of the educational institutions have been utilizing a variety of approaches just to ensure that the proficiency of their students in English Language will be enhanced. Hence, various academic institutions are utilizing computer technology in teaching the English Language.

Numerous studies affirmed that the learners are considering the computer a vital tool in discovering and learning new vocabulary and likewise in supplementing in-class instructions (Kocak, 1997; Kung & Chuo, 2002; Alshwairkh, 2004; Johnson & Heffernan, 2006; Baturay, 2007).

One of the recent educational technologies for English language teaching and learning is Computer Assisted Language Learning or CALL. The CALL has been recognized by few researchers as a compelling way to deal with teaching and learning the language in which the computer is used as a guide to the presentation, reinforcement and assessment of material to be adapted, including a substantial interactive element. In today's trend of computer technology in the academe, the use of CALL supported by the Dynamic Education (DynED) Language Learning Programme/Software, which is designed to help English Language Learners (ELLs) attain the language they need for success at school, is one of the powerful techniques applied by the greater part of the Higher Education Institutions in enhancing the performances of their students in English language not only in the Philippines but throughout the world. However, its usefulness has also been a subject of deliberation because of the variation occurred in the performances of the students.

Stark (2004) explained that the DynEd software is based on the brain and language acquisition research, making both to form a merged model wherein the exercises in multimedia and interaction available in the classroom supplement each other. The structures of the language and vocabulary conveyed are appropriate to the content classes and even in the social conditions that generally develop in classroom situations. It is normal for ELL students to learn Basic English, yet it is rare that they acquire their academic potential (Suarez-Orozco, 2001; Cummins, 2001). This extensive program addresses their necessity for advancement in academic as well as in social language for academic application as they move to an English-speaking education system.

Recent studies on the effectiveness of using the CALL with the use of the DynED language learning software revealed positive development in the achievement levels of students and have shown positive views on the usage and benefits of DynED courses at schools. Moreover, BAŞ and Kuzucu (2009) claimed that students who are educated by this method are more successful, have a greater motivation and have better retention compared to the students who are instructed by traditional methods. Some authors have also asserted that DynED had an important effect on the students' confidence and performance. However, the effectiveness of the CALL method with the used of the DynED language learning program faced with glitches and

difficulties which are detrimental to students' learning viz., technological problems, limited time of English courses at school, negative attitudes towards the usage of the DynED courses, less support from the administration and limited internet access (Bas, 2010).

From the literature review, it is evident that most of the institutions offering DynEd Language Learning Program, despite the problems encountered, have a positive impact on enhancing the performances of their students in English Language. The more time spent by the students learning the language, the more knowledge gained. However, the increased knowledge in the language varied from one student to another. Some might have significant improvements while others do not.

Hence, in order to assess the effect of the DynEd Program through CALL in enhancing the English Language proficiency of the students of Northwestern Mindanao State College of Science and Technology, the pretest and post-test results of their English language proficiency were evaluated. And considering the different effect derived from one institution to another on the usage of this new method, it is expedient to analyze the performance of the students in English language using the CALL and Dyned Software using a more powerful approach. And this approach uses fractal statistics.

Conceptual Framework

This study is anchored on the theory of Recursive Hierarchical Recognition: A brain-based theory of Language Learning of Knowles (2008) which explains that the utilization of multimedia computers allows for multimodal input and practice, where the learning activities can take advantage of the hierarchical structure of the human brain and the interplay between listening, speaking, memory, and the pattern recognition logic that is at the heart of human intelligence.

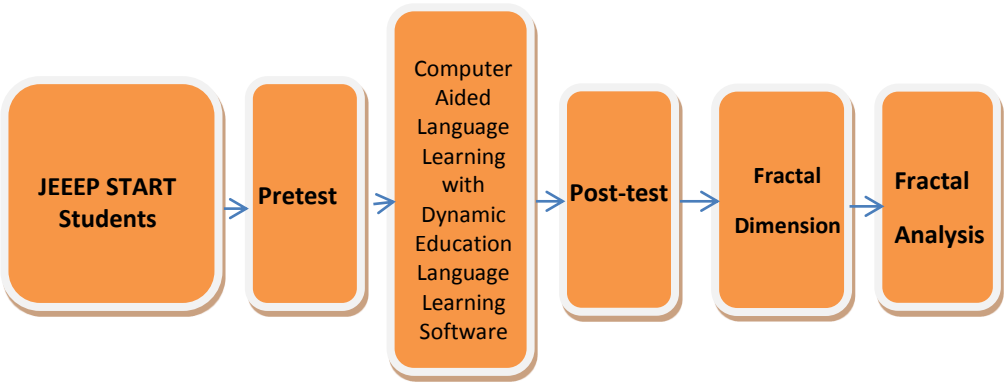


Figure 1. Schematic Diagram of the Study

The Dynamic Education Language Learning system utilized as part of CALL method is a developed courseware in accordance with the principal theories of language acquisition. Generally, the coursewares developed rely upon sound, time-proven methods in dealing with language teaching, curriculum design, and likewise human interface design. This kind of program has been proven substantial and effective. In fact, the length of time of this language program around the world is one evidence that shows how effective is the courseware (www.dyned.com).

To analyze the performance of the students in English Language using the CALL method with the use of DynEd Software, the results of the pretest and post-test for the NMSCST students who have undergone the JEEP START classes were used to come up with a fractal analysis.

The pre-test (placement test) of the students covers vocabulary and grammar, listening comprehension, sentence construction, and sentence ordering. The placement test is designed as a guide to place students at the appropriate beginning stage within DynEd's series of courses. This is a computer adaptive, variable length test which will respond to and adjusts to the student's performance. If the student performs well in the examination, the test will increase more rapidly to higher-level items and eventually will continue up to the time the student has done 60~75 items for every part of the given test (Part 1 and Part 2) or 135-140 test items for those who are taking both Part 1 & Part 2. For someone at a lower language level, the given test will continue gradually and it will end once a student oversights a significant question or a number of items at any phase of the test or if the on-going total test score falls on the specified cut-off points (DynEd English Language Solution, 2007).

After a year of studying English language applying the CALL method with the use of DynED Software, the student will then retake the test (post-test) to verify if he/she has a significant improvement in his/her English Language proficiency. The results of the post-test will then be evaluated using a more powerful and effective statistics and that is through fractals.

The nature of fractals can be simply understood as a set or pattern in which there are far smaller things than large ones. Let us take into account the geographic features, naturally small geographic features are far more than the large ones on the earth's surface. In relation to test scores, naturally, low scores are flourishing than higher scores. When most students get high scores, it destroys the natural state; however, it implies that something has been done. There might be a lot of interferences applied that tend to improve the students' academic performance. The fractal dimensions will then account the number of interventions/causes that destroy the natural state of the variable. So, the greater the fractal dimension is, the greater the number of interventions applied.

Research Methodology

This study employed the descriptive method utilizing the secondary data of the JEEP Start students. The data were taken from the Records Manager of the Dyned Software. These were the results of the students' placement test (pre-test and post-test) using the DynED Language Learning Software. The test is a diagnostic examination to measure the level of English Language proficiency of every student. The students are required to take the pre-test at the beginning of their class in English Language using the DynED software and required to take the post-test after a year of studying to determine the students' learning. However, only the data of the test results of the 364 or 95% of the students enrolled in JEEP Start during the SY 2013-2014 were analyzed in this study.

To determine the fractality of the test results, we processed the data using software to create a graphical representation through a histogram. If the histogram does not show fractality, then, we calculate the logarithm of the data to determine if it is distributed exponentially. If the exponential distribution is reflected in the histogram, the values of the variable signify fractality. In other words, the variable, either x (pre-test) or y (post-test), does not leave from its natural state of which smaller values are far more than the large ones. On the other hand, if the data are non-fractal in nature, it means that the data have departed from their natural state which indicates that something has been done that changed it from their natural state. The

non-fractal observations are analyzed separately to determine the possible reasons or interventions applied. Then, the fractal dimensions of the log x and y were computed in order to help in hunting the hidden dimensions of the CALL method and DynEd Software to enhance the students' performance in the English Language. The fractal dimension indicates the number of reasons or interventions identified in the study.

Results

Data on the pre-test and post-test of the students' English Language Proficiency were obtained from the Records Manager of the Dynamic Education Software for the SY 2013-2014. This information was analyzed through fractal statistics.

Figures 2 and 3 show the histogram of the pre-test of the students' English Proficiency and its logarithm, respectively.

Figure 2. Histogram of the Pre-test Results in English Language

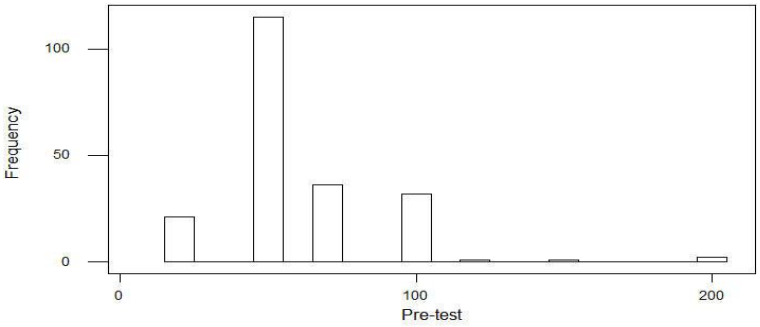
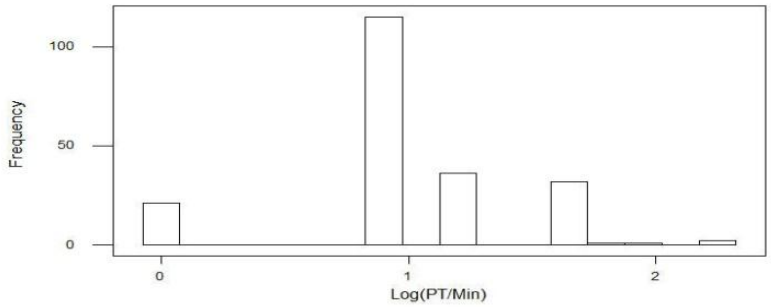


Figure 2 shows the histogram of the pretest results of the students in NMSCST in English Language. As shown in this figure, the histogram confirms that there are more students who have acquired lower scores in pre-test than those who got higher scores. However, because the data did not appear to be exponential, we hypothesized that the scores of the 364 students in pre-test are not probably fractal, but are probably different from their natural state. The few students with very low scores and those several students with high scores appeared to destroy the fractality of the observations. In order to confirm if the observations are not fractal in nature, we obtained the logarithm of the scores of the students in their pre-test and constructed the histogram as reflected in Figure 3.

Figure 3. Histogram of the Logarithm of Pre-test Result in English Language



Fractal Dimension: 1.98863

The histogram of the students' performance in their pre-test based on its logarithm departed from its fractality, more likely because the data did not appear to be exponential. However, the fractal dimension of the log is 1.98863.

Discussion

Of the two histograms, the latter reveals hidden dimensions that departed students' performance in English Language from its natural state. By employing this new approach, it defuses the difficulty in identifying these dimensions in their performances. The histogram of the log x (pre-test) appeared to have 1.98863 fractal dimensions which indicate that there are two common characteristics or hidden dimensions of the students' performance in English Language that need to be hunted.

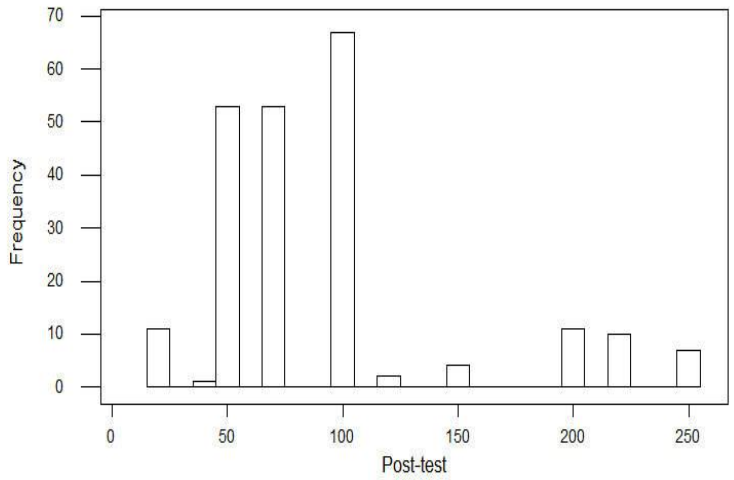
In order to determine the hidden dimensions, we have determined the students who have a significant influence on the non-fractal distribution of the data founded on the results in Figure 3 and identified their common characteristics or abilities. As observed, the students identified are academically challenged. They are the students who are not yet ready to proceed and earn their degree course in college; they are considered as underprepared. Moreover, these students have anxiety in taking a test which resulted in having poor performance in their pre-test. Howey (1999) affirmed that underprepared students suffered more from test anxiety.

Another characteristic identified is the lack of computer skill. Since the test is administered through a computer, the students tremendously

experienced difficulty in taking the examination. They experienced reluctances in using the mouse, headset, keyboard and other parts of the computer that contributed to the underperformance of the students. This is supported by Haring et al., (1978) in his study that when students lack the capability to complete an academic task because of limited or missing basic skills, cognitive strategies, or academic-enabling skills, that students are still in the acquisition stage of learning. Furthermore, Daly, et al. (1997) mentioned that students cannot be expected to be motivated or to be successful as learners unless they are first explicitly taught weak or absent essential skills.

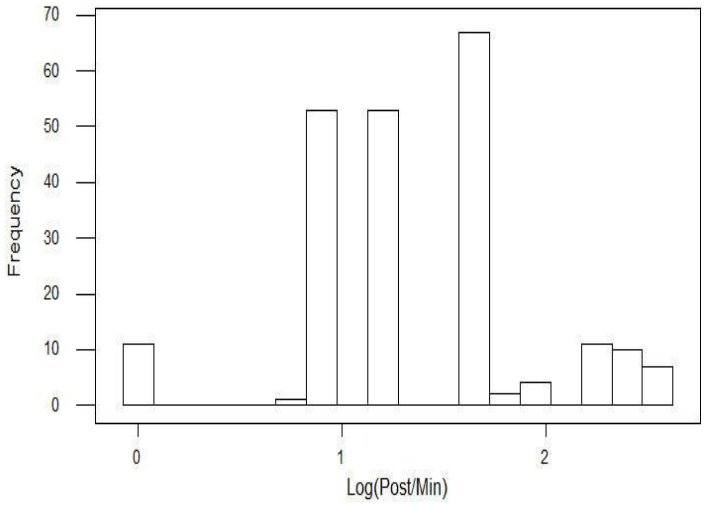
Figures 4 and 5 show the histogram of the post-test results of the students in English Language and its logarithm, respectively.

Figure 4. Histogram of the Post-test Results in English Language



The graphical representation of the post-test results of the students in English Language displays a greater variety of their performances; however, most of the students registered better performance compared to their pretest. This implies that the CALL method with the use of DynEd Software is indeed an efficient program in enhancing students' performance in English Language.

Figure 5. Histogram of the Logarithm of Post-test results in English Language



Fractal Dimension: 1.72490

This figure shows that the Y (post-test) variable has departed from its natural state since the distribution of values is not exponential.

Discussion

Both histograms display positive improvements to the English Proficiency level of the students since most of their scores are increasing significantly. This is the fundamental reason why the data depart from their natural state in which the low scores are far more than higher scores. It is; therefore, indicative to claim that the interventions (Mastery Tests, Extension Activities, etc.) applied to students are useful and effective in enhancing students' proficiency in the English Language. The use of Computer-Assisted Language Learning greatly motivates the students to learn the language and the program of the Dynamic Education is far more effective than the traditional learning materials. It is more effective than the traditional learning materials because the DynEd software provides a lot of lessons and interventions suited to the need of the students. The software per se has its features that provide students the lessons parallel to the levels of their proficiency. For example, a student with poor performance in the pre-test is provided with lessons and extension activities that correspond to his/her level. The purpose is to practice the lessons that are well-matched to the level

of English Language Proficiency of the student. The more lessons match to the level of the student's proficiency, the more knowledge increases. Moreover, the student cannot proceed to another lesson unless he/she will eventually reach the required number of hours or lessons assigned to him/her and likewise gets a passing score on the mastery test. However, if student acquires better performance, he/she is provided with numerous coursewares/lessons to study that matches to his/her proficiency and proceed to another complex lesson if he/she can pass the mastery test. In addition, the software provides language structures and vocabulary that are specific to the content classes and that the social situations given normally occur in a classroom situation.

Another substantial dimension that has been discovered is that the Computer Assisted Language Learning method supported by the DynEd Software is most effective when students have an average level in English Language. This claim is based on the results of the students' post-test. Subsequently, most of the students with good scores in pre-test obtained exemplary scores in their post-test. In other words, students with average levels in English language are far more interested in utilizing the DynED Software in learning the language as compared with those students who have obtained higher scores on the post-test but very low on their pre-test. Moreover, the number of coursewares/lessons provided by the software contribute significantly to the students with average levels in English language, since lots of coursewares/lessons are delivered to those who have acquired more than 1.2 pre-test score than those students with less than 1.0. It is obvious that the students with average levels in English language will eventually have a significant improvement than those students with limited lessons. Thus, the more the student gets a higher score in his/her placement test, the more lessons he/she learns.

Conclusion

The Computer-Assisted Language Learning with the use of Dynamic Education Software is the most efficient and useful way of learning the English Language. However, DynED software is far more effective for students with average levels in English language. Therefore, in order for the DynEd software to have an optimum impact, students with average levels in English language will only be enrolled in the JEEP Start Course, however, two (2) hours laboratory use of the Dyned software will be integrated to Speech and Oral Communication Subject for the benefit of the studentry in general.

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