

THE DEVELOPMENT AND EFFECTIVENESS
OF USING ILLUSTRATED DICTIONARY
IN LEARNING TRIGONOMETRY
TOWARDS TENTH-GRADE
STUDENTS' PERFORMANCE
AND MOTIVATION

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UNIVERSITI PENDIDIKAN SULTAN IDRIS
2023



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DICTIONARY IN LEARNING TRIGONOMETRY TOWARDS
TENTH GRADE STUDENTS' PERFORMANCE
AND MOTIVATION

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DISSERTATION SUBMITTED IN FULFILLMENT OF THE REQUIREMENT FOR THE DEGREE
OF MASTER OF EDUCATION
(MASTER BY RESEARCH MODE)

FACULTY OF SCIENCE AND MATHEMATICS
SULTAN IDRIS EDUCATION UNIVERSITY

2023



UPSI/IPS-3/BO 32

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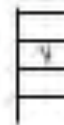
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ACKNOWLEDGEMENT

With the blessings and grace given to me by God, I am able to finish my dissertation. In the efforts of developing the Illustrated dictionary, testing and collecting the data for this research, I would like to thank my supervisor, Dr. Raja Lailatul Zuraida binti Raja Maamor Shah for her continued guidance and advice, the teachers and students of a secondary school in United Arab Emirates, family and friends who constantly supported and encouraged me to complete this dissertation. My heartfelt thanks and appreciation to all who helped me to endure this tremendous journey of learning.

ABSTRACT

This study aims to examine the development and effectiveness of illustrated dictionary in Trigonometry towards grade ten students' performance and motivation. The pre-test and post-test non-equivalent control group quasi-experimental design was used. The selection of samples was conducted by cluster probability sampling from two out of 4 campuses of Sharjah American International Schools (SAIS) involving 60 students. The samples were divided equally into control and treatment groups of 30 students each. A three-week intervention was carried out. A set of pre-test and post-test on trigonometry were used. A motivation questionnaire was given to the treatment group only. A descriptive analysis was used to describe the students' performance on the topic, while an independent t-test was used to determine the differences between the two teaching strategies. The questionnaire designed to measure the extent of students' motivation after using the illustrated dictionary was also analyzed through descriptive statistics, as well as the correlation coefficient to reveal the relationship between the use of the illustrated dictionary and students' motivation. Based on the t-test analysis, the mean score of the treatment group was higher than the mean score of the control group significantly [$t(50) = -11.639$, $p < 0.05$]. The treatment group's students' performance gained significantly higher than the control group. It was also revealed that there is a positive significant correlation between the students' scores in the achievement post-test and on their motivations towards Illustrated dictionary after the treatment ($r = 0.689$, $p = 0.001$). In conclusion, the effectiveness of using the Illustrated Dictionary strategy in Trigonometry has improved the students' performance and motivation. The implication of the study shows that this illustrated dictionary can be used as a teaching aid in improving students' understanding and motivation towards trigonometry.

**PEMBANGUNAN DAN KEBERKESANAN PENGGUNAAN KAMUS
BERGAMBAR DALAM PEMBELAJARAN TRIGONOMETRI
TERHADAP PRESTASI DAN MOTIVASI
PELAJAR GRED SEPULUH**

ABSTRAK

Kajian ini bertujuan untuk mengkaji pembangunan dan keberkesanan kamus bergambar dalam Trigonometri terhadap prestasi dan motivasi pelajar gred sepuluh. Reka bentuk kuasi eksperimen kumpulan kawalan bukan setara ujian-pra dan ujian-pasca telah digunakan. Pemilihan sampel dijalankan secara persampelan kebarangkalian kelompok daripada dua dari 4 kampus Sharjah American International Schools (SAIS) yang melibatkan 60 orang pelajar. Sampel dibahagikan sama rata kepada kumpulan kawalan dan rawatan dengan masing-masing mempunyai seramai 30 orang pelajar. Intervensi selama tiga minggu telah dijalankan. Instrumen kajian yang digunakan ialah satu set ujian-pra dan ujian-pasca trigonometri. Soal selidik motivasi diberikan kepada kumpulan rawatan sahaja. Analisis deskriptif digunakan untuk menghuraikan prestasi pelajar mengenai topik tersebut, manakala ujian-t bebas digunakan untuk menentukan perbezaan antara kedua-dua strategi pengajaran. Soal selidik yang direka bentuk untuk mengukur sejauh mana motivasi pelajar selepas menggunakan kamus bergambar juga dianalisis melalui statistik deskriptif, serta pekali korelasi untuk menyatakan hubungan antara penggunaan kamus bergambar dengan motivasi pelajar. Berdasarkan analisis ujian-t, skor min kumpulan rawatan adalah lebih tinggi daripada skor min kumpulan kawalan secara signifikan [$t(50) = -11.639$, $p < 0.05$]. Prestasi pelajar kumpulan rawatan meningkat dengan ketara lebih tinggi daripada kumpulan kawalan. Didapati juga korelasi antara markah pelajar dalam pencapaian ujian pasca dan motivasi mereka terhadap kamus bergambar selepas rawatan ($r=0.689$, $p=0.001$) adalah signifikan yang positif. Kesimpulannya, keberkesanan penggunaan strategi kamus bergambar dalam pembelajaran Trigonometri telah meningkatkan prestasi dan motivasi pelajar. Implikasi kajian menunjukkan bahawa kamus bergambar ini boleh digunakan sebagai bahan bantu mengajar dalam meningkatkan kefahaman dan motivasi pelajar terhadap trigonometri.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Teaching trigonometry in a foreign language has become a common practice in most parts of the world (UNESCO, 2020). Illustrated dictionary is thus the extent to which meanings of some mathematical terms are interpreted and understood by students for whom English is a second language (Zuraida, 2022). This Mathematics branch concerns the study of ratios between the sides of a right triangle with reference to the acute angle/trigonometric functions. The subject applies specific functions of angles and their application to calculations which are known to be, sine (sin), cosine (cos), tangent (tan), cotangent (cot), secant (sec), and cosecant (csc) (Bing, 2020). The UAE Syllabus in the subject of Mathematics has undergone changes from time to time in accordance with societal emerging needs and subject growth, presently the designed syllabus is in accordance with National Curriculum Framework 2005 and as per guidelines given in Focus Group on Teaching of Mathematics 2005 which is to meet the emerging needs of all categories of students (Bhagat & Chang, 2018).



The Tenth grade Mathametics syllabus is found to be very vast with so much demand for regular practice to score well, in the UAE, key topics of mathematics for grade 10 are Areas related to Cirles, Arithmetic Progression, Circles, Constructions, Coordinate Geometry, Introduction to Trigonometry, Linear Equations in two variables, Polynomials. The objectives of grade 10 trigonometry and Mathematics are to ensure that students; develop interest in the subject by participating in related competitions, have knowledge and critical understanding, particularly by way of motivation and visualization, of basic concepts, terms, principles, symbols and mastery of underlying processes and skills, apply the knowledge and skills acquired to solve problems and wherever possible, develop an interest in students to study Mathematics as a discipline and feel the flow of reasons while proving a result or solving a problem. Also to develop positive attitude to think, analyze and articulate logically, acquaint students with different aspects of Mathematics used in daily life, to develop awareness of the need for national integration, protection of environment, observance of small family norms, removal of social barriers, elimination of gender biases and to develop reverence and respect towards great Mathematicians for their contributions to the field of Mathematics.

Mathematics generally depends on language in applying mathematical skills to specifically solve real problems and particularly develop mathematical thinking among learners (Dina, 2019). For effective usage of illustrated dictionary in teaching mathematics, learners must acquire the special meanings of some English words in the mathematical content, also integrate learners into mathematics and creating life situations through problems in which the language of mathematics is used so as to develop mathematical thinking skills and acquiring linguistic mathematical terms



requires (Phan, 2020). Educational institutions must therefore focus on the language structure of the learner, and the development of language and terminology of mathematics through curricula, programs and strategies that facilitate the learner's acquisition of mathematics in English (Muhammad, 2019). Accordingly, various programs should be prepared based on some strategies for effective learning of trigonometry in the English language to develop mathematical thinking and understanding of terms among students.

In the same tone, cooperative learning (CL) as illustrated in the theory of communication has been assumed to help the students better understand the concept of trigonometry, it makes the teaching and learning of trigonometry motivating thereby making students to fully participate (Samuel, 2019). Classroom activities should be reduced from practice exercises (mechanical drill) to inquiry activities requiring more time on cooperative learning (Nambeye & Elizabeth, 2019). Whether in Dictionary illustration for trigonometry, cooperative learning can be used to promote classroom discourse and oral language development, also at the onset of Math instruction as a means of reviewing skills and concepts or after the presentation of subject matter where new material is practiced within the context of previously taught material (WETA, 2023). It is consequently fundamental to realize the effectiveness and development of illustrated dictionaries in learning Trigonometry.



1.2 Research Background

The word trigonometry is a 16th-century Latin derivative from the Greek words for triangle (*trigōnon*) and measure (*metron*). Though the field emerged in Greece during the third century B.C., some of the most important contributions (such as the sine function) came from India in the fifth century A.D. Because early trigonometric works of Ancient Greece have been lost, it is not known whether Indian scholars developed trigonometry independently or after Greek influence. Katz in 1990s refers to Trigonometry as a branch of mathematics that studies relationships between the sides and angles of triangles. Yet the illustrated dictionary is an interactive educational tool consisting of basically several pre-made lessons using a program called Classkick and equipped with kind of many particularly effective educational tools definitely such as pictures, mathematical figures and all kinds of illustrations that indicate the meanings of words that students may need during the learning process along with written texts that literally explain meaning of words, through videos that for the most part is recorded and combined by the same program, which essentially is quite significant (Darhower, 2018).

Globally, Mathematics educators worry a lot that poor language skills do not only prevent students from learning mathematics effectively but also hinder effective instruction of teachers (Sayed, 2020). In the same way Abdurrahman (2020) and Sayed & Zuraida (2022) agreed that the use of language dictionaries helps to boost performance of learners in all fields, hence illustrated dictionary and student's achievement in mathematics is statistically significant in UAE. Similarly, many scholars like Henry and Baltes (2022) have shown that both language and pedagogical elements highly affect the teaching and learning of mathematics (Darhower, 2019).





It is common for people to make mistakes while completing trigonometry questions verbally or in writing thus most students find the subject difficult when compared to other areas of study (Ernaningsih & Wicasari, 2017). Research has proven that the use of art and illustrations as a learning tool leads to raising and increasing the ability to creative thinking, as well as developing visual-spatial ability, stimulating analytical and abstract thinking (Ahmad, 2019). It is very important to consider the effectiveness and development of illustrated dictionary in Trigonometry learning so as to enable students to generally comprehend different concepts and principles of the subject and also reduce Errors in the solution of mathematical problems (Mensah, 2017). Students are literally confronted with a large number of challenges throughout the process of learning and teaching mathematics. Many studies that focus on mathematical education indicate that students have misunderstandings and, in general, make errors, and that these scenarios arise as a result of the complexity of the subject matter being learned.

Illustrated dictionary learning has got a significant relationship with student achievement in mathematics in Sharjah School in UAE (Sayed, 2022). It (ID) provides very helpful and clear information which is always easy to understand, in the current context, the effectiveness of illustrated dictionary is expected to contribute to Trigonometry learning in the tenth grade of UAE students. Nevertheless, the tendency of many educational institutions to teach scientific subjects, especially mathematics in English has yielded counterproductive results and a negative impact on some students in their performance and achievement in mathematics (Abdirahman, 2020). The disparity in academic achievement levels in all subjects, particularly mathematics, among students is one of the topics that has piqued the interest of many different types





of students and researchers in the field of education in the United Arab Emirates. A lot of research has confirmed that poor language skills may literally impair students' academic achievement abilities. This study will attempt to kind of reveal the impact of weak English language skills on the achievement of private school students in Sharjah, through the use of an educational strategy that works to really treat weak English language skills, especially those related to mathematics terms, in a subtle way.

The Illustrated Dictionary motivates students, simplifies learning and enhances the vocabulary learning achievement. Amirian (2018) thought that illustrated dictionary saves time, effort and builds confidence for learners since they learn vocabulary independently unlike the traditional teaching method of teaching geometry in general and trigonometry where students can not discover their own knowledge because they become passive and merely observers (Fabi, 2017). To solve the problems that students face in dealing with trigonometry, an illustrated dictionary was tabled by this study since it is an educational strategy that combines several teaching aids to help students learn the concept of trigonometry. Often, the illustrated dictionary is presented and displayed through a freely available program on the Internet called Classkick.

Lack of strong motivation in students to successfully learn mathematics, has negatively affected students' performance and really prompted them to switch between schools. Much as teachers have the ability to physically aid students in generating word wealth and to boost their grasp of subject matter in a particularly significant manner, blending cooperative learning (CL) with illustrated dictionary is still lacking yet an equally vital strategy in developing inclusive classroom settings that cater to the requirements of every single student. This is because CL takes into account the diversity





of the student body and promotes connection and support among classmates (Nambeye, 2020). In spite of the large number of studies on trigonometry that are already accessible, very little research has been conducted on the subject of inspiring students to study trigonometry through improving students' linguistic abilities via the use of illustrated dictionaries.

Currently, researchers have described students with limited proficiency in the English language which leads to misinterpretation of mathematical concepts and principles, axioms, and theorems (Vukovic, 2018). The teaching methods in most UAE institutions are tightened to the generally ancient educational philosophy, which for the most part is based on the student's mind as a vessel for preserving and retrieving information, and accordingly the testing process takes place. It is difficult to specifically attribute the students' poor performance to any one factor. Thus the motive behind this investigation was to examine the development and effectiveness of using illustrated dictionary in learning trigonometry towards tenth grade students' performance and motivation. This study will design strategies for the development of Mathematics thinking and application skills by the use of illustrated dictionary. Chapter One of the thesis has therefore covered the research background, problem statement and research objectives, research questions, conceptual framework, hypothesis, operation definitions and study purpose.



1.3 Statement of the Problem

As UAE matches toward scientific and technological advancement, there is need to focus on good performance in mathematics at all levels of schooling. For the past 5 years, a number of studies have clearly indicated that a student's command of English plays a big role in mathematics performance (Abdurrahman, 2020). Unfortunately, ADEK (2018) reported that students continuously face challenges in trigonometry topics. Also the ineffectiveness of instructional strategies that some mathematics teachers are using in classrooms has hindered motivation and achievement (Nambeye, 2019). It is very sad that performance in mathematics has been relatively poor despite the national efforts made through developing a curriculum that is appropriate to the needs of the country. In general practice, 21% of students are challenged with the terminologies used, 79% face challenges with trigonometric ratios, and 79% are challenged with solving problems involving sine and cosine rules (Kagenyi, 2019).

Recently, some schools started to integrate Science and Math in English in order to give students the chance to use English in different subjects and open their mind to the academic language and its use (Dafouz & Smit, 2018). The research study findings by Abdelhamid (2022) came up with a significant correlation between illustrated language dictionary and students' achievement in mathematics in Sharjah School in UAE, unfortunately students with limited proficiency in the English language often misinterpret mathematical principles, axioms, and theorems (Vukovic & Lesaux, 2018). Educators claim that the students' lack of English language proficiency hinders effective learning of mathematics (Abdelhamid, 2022). Lesaux (2018) stated that language affects how students interpret different concepts thus there is still need to





develop illustrated dictionary for improved performance.

Although researchers like Kagenyi (2018) have related trigonometry topics questions with overall performance in mathematics, the development and effectiveness of using illustrated dictionary is facing challenges like poor teaching methods, lack of teaching resources and negative students attitude especially in the UAE. Worst of all, issues on the role of language in mathematics instruction have not been dealt with, yet the studies done in other countries show that learners have difficulties with the language of mathematics (Muhammed, 2018). This suggests that, if the teacher tries to force new ideas that cannot be related to those already learned and mastered, new ideas can only be learned in a disconnected manner. Therefore, several pedagogical factors like, inappropriate teaching and learning method applied, shortage or inadequate trigonometry teaching and learning resources, teacher and student attitudes towards trigonometry, classroom atmosphere and teacher teaching behaviour to learning process of trigonometry and inappropriate interaction patterns during teaching and learning process of trigonometry.

Kamber (2018) students have difficulties with properties of periodicity and the fact that trigonometric functions are not one-to-one. In addition, the pre-test and post-test non-equivalent control group quasi-experimental design has not been previously employed in the related context. Students have a particularly tough time mastering trigonometry difficulties since they are required to study a wide variety of ideas that are all interconnected with one another (Ngu & Phan, 2020). Grade ten mathematics curriculum must equip learners with trigonometry problem solving techniques which requires an understanding of a number of interconnected mathematical concepts, such





as skills in algebraic transformation, knowledge of geometry, and the ability to reason about the graphical representation of concepts.

Kamber and Takaci (2018) blame insufficient literature on the currently instigated variables to the extent that only a few studies highlight processes and skills in solving problems in trigonometry for instance, Usam and Mohammad (2019) and Mensah (2017) Hokor (2021) among others only analyzed students' error in learning of trigonometry which focused on the manipulation. This researcher aimed to develop strategies for effective usage of illustrated dictionary in trigonometry, which is generally already used by many teachers as a tool to treat language impairment and specifically raise the level of motivation, achievement and performance in mathematics. Therefore, the researcher recommended the use of illustrated dictionary containing most of the vocabulary that students may need, supported by videos to explain and clarify the very specific meaning in the context. The researcher sought to devise possible ways of encouraging students to seek help from classmates or even the teacher through cooperative learning.

Rahmatya and Dina (2019) urge that students need to be able to formulate and solve complex problems. They can acquire ways of thinking, habits of persistence and curiosity, also self-confidence to solve other problems in the real life, also language richness provides a strong foundation for later learning (Pellegrino, 2017). As a result of all of what was particularly mentioned, the researcher's opinion is that it is necessary to work on solving this problem that mostly affects students of the higher levels through the design and development of an educational tool that works in two directions. The first direction is to solve the problem of the poor English language skills that





specifically affect students' performance in mathematics, and the second kind of is to motivate students towards learning mathematics, especially Trigonometry.

1.4 Purpose of the Study

To examine the effectiveness and development of illustrated dictionary in Trigonometry, verify the validity of the illustrated dictionary, motivation survey, in addition to testing raising the level of student's achievement and motivating them towards studying right triangles and trigonometry.



1. To develop strategies for using Illustrated Dictionary in learning the Trigonometry concept for grade ten students.
2. To test the effectiveness of using the illustrated dictionary for students in Sharjah School UAE with English language impairments in mathematics achievement.
3. To test the effectiveness of using the illustrated dictionary in motivating students at Sharjah School UAE.
4. To test the correlation between the use of the illustrated dictionary as a motivational education tool and the mean scores of students in the post-test.



1.6 Research Questions

1. Is the illustrated dictionary characterized by reliability and validity regarding the performance and motivation of tenth grade students in learning trigonometry?
2. What is the difference between the mean scores of the control and treatment group students' performance in The Trigonometry before any intervention is given in learning Trigonometry?
3. What is the difference between the mean scores of the control group students' performance after a conventional strategy of learning Right Triangles Trigonometry is used and the treatment group students' performance in Right Triangles Trigonometry after the illustrated dictionary is used in learning Right Triangles Trigonometry?
4. Are there any significant changes in the mean scores of the control group students' performance before and after the conventional strategy of learning Right Triangles Trigonometry?
5. Are there any significant changes in the mean scores of the treatment group students' performance before and after the illustrated dictionary strategy is used in learning Right Triangles Trigonometry?
6. Is there a statistically significant correlation between the use of the Illustrated dictionary as a motivational education tool for tenth grade students in learning the concept of trigonometry and the mean scores of students in the post-test?



1.7 Hypotheses of the Research

In an attempt to answer the questions of the study the following hypotheses were raised.

H01: There is no significant difference between the mean scores of the control group students' performance and the treatment group students' performance in Trigonometry before any intervention is implemented.

H02: There is no significant difference between the mean scores of the control group students' performance after a conventional strategy of learning Trigonometry is implemented and the treatment group students' performance in Trigonometry after the illustrated dictionary in conjunction with the cooperative learning strategy is used in learning Right Triangles Trigonometry is implemented.

H03: There are no significant changes in the mean scores of the control group students' performance before and after the conventional strategy of learning Trigonometry is implemented.

H04: There are no significant changes in the mean scores of the treatment group students' performance before and after Illustrated dictionary strategy for Trigonometry is implemented.

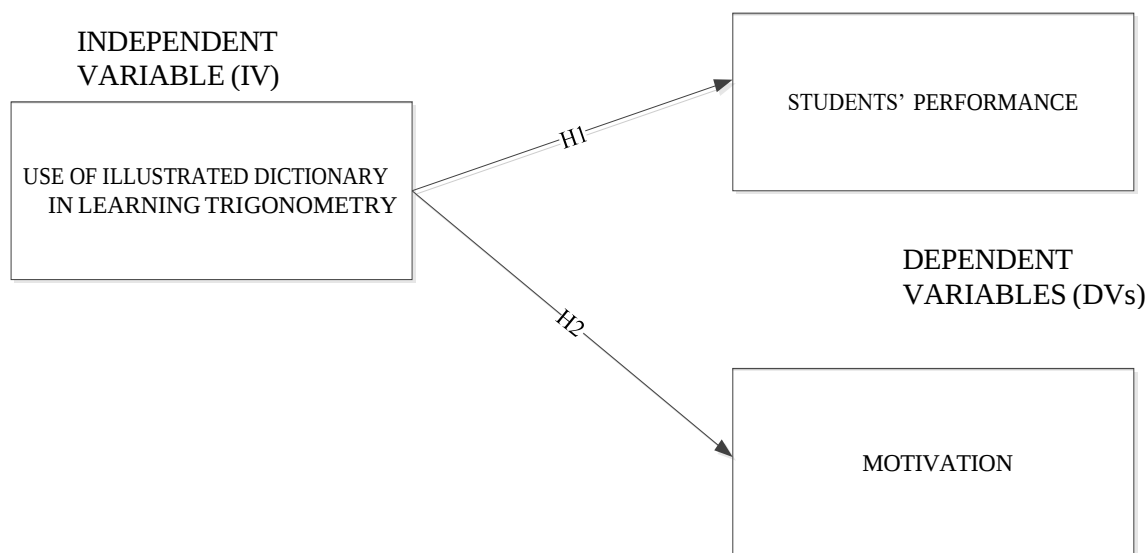
H05: There is no statistically significant correlation between the use of the illustrated dictionary as a motivational education tool for tenth grade students in learning the concept of trigonometry and the mean scores of students in the post-test.



1.8 Conceptual Framework

Figure 1.1

Conceptual Framework for Learning Illustrated Dictionary



The conceptual framework begins with defining the two theories on which the researcher will rely in developing the illustrated dictionary based on the ADDIE model to motivate and raise the performance of tenth grade students in trigonometry.

The researcher bases his work on two theories: the theory of mathematical communication, which states that students need to be able to communicate, explain, analyse, listen, question, and cooperate in particular in order to achieve their goals, and the theory of mathematical representation, which states that the learner needs drawings, graphs, diagrams, and other representations to express anything. The researcher bases their work on these two theories. A more in-depth comprehension of mathematical concepts.

The Illustrated Dictionary is tested and revised carefully to make sure that the teaching and learning process for the intervention group runs smoothly. Any problems that is due to happen is likely to be found in previewed lesson and the problems should be fixed.

Using the Illustrated Dictionary will, for the most part, give the students the ability to reflect and make their own conjectures on the Right Triangles and Trigonometry concepts in a subtle way. All the Right Triangles and Trigonometry concepts kind of continued to specifically be explored with the use of the activity book and the Illustrated Dictionary, or so they kind of thought. Using the manipulatives continuously will give the students, for all intents and purposes, more experience and the ability to specifically solve problems in the right triangles and trigonometry concepts in a big way. The use of manipulatives will particularly give relevance to the students' performance in the post-test.

After finishing the preparation and development of the illustrated dictionary in light of the ADDIE model, the effectiveness and impact of the illustrated dictionary in motivating students and raising their performance in the concept of trigonometry is tested. This takes place after the preparation and development of the illustrated dictionary has been completed. One is an experimental group, and the other serves as a control. While the other group uses more conventional educational approaches, the experimental group is learning about trigonometry through the use of an illustrated dictionary. In the beginning of the experiment, students in both groups are evaluated with a preliminary exam. After three weeks have passed since the commencement of the experiment, students are evaluated with a post test as well. With the use of the

illustrated dictionary and a questionnaire that was only given out to students in the experimental group, we were able to determine the level of interest that the students in the experimental group had in the subject of trigonometry.

The final step is to collect the data that was obtained from both groups, which are the results of the pre and post test, as well as the incentive survey data from the experimental group only, and then finally, to analyse and test these data and results to measure the effectiveness of the illustrated dictionary in raising students' achievement and motivating them towards the concept of trigonometry.

1.9 Research Gap

Much as trigonometry is an essential field of mathematics, research in this field is quite limited (Kamber & Takaci, 2018). The few dominating studies conclude that most students make error in transformation and process skill in solving problems in trigonometry but do not provide reliable solution to the issues for instance, Usam & Mohammad (2019), Mensah (2017). Hokor (2021) among others only analyzed students' error in learning of trigonometry which focused on the manipulation of trigonometrically ratios using formula and the right-angled triangle. Also such investigations only referred to pedagogical issues in other environments like Nigeria, and Ghana other than the UAE. The current research will thus table the illustration dictionary as a foundation to trigonometry performance and motivation in grade ten students.



1.10 Operational Definition

Illustrated Dictionary

The characteristics of an Illustrated Dictionary are summarized as, it has realistic examples, easy to comprehend definitions of words, it has significant amounts of diagrams, pictures and illustrations, it has interesting designs and themes and level-appropriate synonyms, antonyms and homonyms. Illustrated dictionary learning offers more than the average dictionary, this book contains help with simple grammar and punctuation with example sentences showing how words are used. Provides very helpful and clear information which is always easy to understand, in the current context, the effectiveness of illustrated dictionary is expected to contribute to Trigonometry learning in the tenth grade of UAE students.

Trigonometry

Mathematically speaking, trigonometry is a branch of study that focuses on angle functions and how such functions may be used to computations. When doing trigonometry, it is common practise to make use of the following six functions of an angle: The names and acronyms for these functions are as follows: sine (sin), cosine (cos), tangent (tan), cotangent (cot), secant (sec), and cosecant (csc). These six trigonometric functions are illustrated with regard to a right triangle in the picture. A triangle's sine of A, also known as $\sin A$, is defined as the ratio of the side opposite to A to the side opposite to the right angle (the hypotenuse).





Each of the other trigonometric functions is defined in a manner that is analogous to this. These functions are features of angles A that remain the same regardless of the size of the triangle, and computed values were listed for a wide variety of angles up to the advent of computers, which made trigonometry tables obsolete. Trigonometric functions are utilised in the process of calculating distances and angles in geometric forms based on angles that are either known or measured. Trigonometry was developed as a result of the requirement for professionals in fields such as astronomy, mapping, surveying, and artillery range finding to be able to compute angles and distances. Plane trigonometry focuses on solving problems that include angles and lengths that are contained inside a single plane. The field of spherical trigonometry takes into account applications to problems that are similar in more than one plane of space's three-



Students' Performance

In this research, students' performance is defined by the marks obtained by the students. The students are given two tests which are pre-test and post-test. The improvement of the students' post-test from the pre-test would reflect on the students' performance. This relates with "academic achievement" (the degree of acquisition that an individual has obtained, as well as the amount of success that an individual has attained or acquired in a given area (Allam, 2019). The present study defines it procedurally as being in position to get good results from Trigonometry or having the positive mathematical abilities. It is assessed by the degree to which the student gets on the cognitive achievement exam that is included in the mathematics course.





Motivation

Motivation in this case is the psychological process which energizes students to be determined towards succeeding in the mathematics topic Trigonometry. Li (2020) found motivation, peer relationships, and self-efficacy, as the contributing factors for performance in mathematics. In the study of Prast (2018).

Cooperative Learning

Students participate in cooperative learning, which is a teaching strategy that involves them working together in small groups of two or more people to complete a series of tasks geared toward the accomplishment of a predetermined objective. At the same time, individuals within the groups receive positive reinforcement based on how well their groups do as a whole (Robiea, 2019).

1.11 Significance of the Research

The UAE ministry of education is guided on policy and organizing trainings to broaden the effectiveness of an illustrated dictionary so as to motivate students of Trigonometry. This means that specialized terms now have an essential and rightful place in mathematics and it is necessary to incorporate them into the learning and teaching of the subject hence supporting mathematics teachers, curriculum planners and textbook authors to deal with poor performance in the subject.





The study guides curriculum development, interpretation and implementation through giving clear understanding of the relationship between illustrated dictionary learning and Trigonometry achievement. This is because findings of this study are a baseline in the activities of the Ministry of Science and Technology (MoEST). Also well planned trainings can stem from this study by recognizing units in the teaching of mathematics so as to give the language of mathematics a special consideration.

The researcher hopes that this study will be source of data for future scholars and concerned educators in the Ministry of Education in UAE so as to promote illustrated dictionary as a strategy in motivating Trigonometry scholars. Mathematics teachers must also benefit from the findings since most challenges are addressed by the new ways of teaching the mathematics terminology. This would enhance the teaching and learning process and, subsequently, improve performance in the subject.

1.12 The Research Scope

This research is about finding out the students' understanding on the Trigonometry concept through the students' performance. There essentially are many methods of teaching Trigonometry. However, the method used in this research specifically is the Illustrated Dictionary strategy and conventional strategy. The students chosen to run the research literally is grade ten students. This is to ensure that students are given opportunity to construct their particularly own understanding than to listen passively to the teachers teaching in a sort of major way. Before students begin to particularly go through the intervention, teachers are given the opportunity to use the Illustrated





Dictionary. This training enables them to use the Illustrated Dictionary strategy effectively.

1.13 Limitations of the Study

This study will be confined to students at Private Schools Students in the Emirate of Sharjah in the United Arab Emirates. This research will be limited to Grade Ten students. Topics of Trigonometry for grade ten in Mathematics subject. This research will be conducted for three weeks with five lessons per week to make sure the students understand the topic of Trigonometry. The topic Right Triangles Trigonometry is conducted for three weeks in the American Syllabus yearly plan. Besides that, the lessons in the textbook, are designed such a way that thirty to thirty-five minutes of a lesson is sufficient. Moreover, the textbook has about twelve lessons. Therefore, the three weeks intervention will be more than sufficient enough to provide the students with the knowledge of Trigonometry concept.

1.14 Framework of the Thesis Organization

The present study contained 5 Chapters. Chapter 1 presented the background of the study. Literature review and related studies were discussed in Chapter 2. Part 1 of this Chapter dealt with Impaired English Language Skills and its related studies. Part 2 of the same chapter reviewed the studies related to Achievement Level in mathematics. In Chapter 3, the researcher described the instruments used in his research. The



interpretation of the results and the discussion were presented in Chapter 4. Finally, the summary of the study including its conclusions, recommendations and suggestions for future studies was discussed in Chapter 5.

1.15 Summary

This chapter gives an explanation on the research background, the problem statement and specified research questions that is relevant to test the effectiveness of the Illustrated Dictionary towards grade 10 students' performance and motivation for the trigonometry.