



# A STUDY ON PRACTICAL GEOMETRY USING ICT TOOL GEOGEBRA

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## ABSTRACT

Information and Communication Technology (ICT) can play a crucial role in the education sector. There are tremendous applications of ICT in the real world. ICT can play great role in agreed and non formal forms of education. The economy has characteristically been divided into agricultural, manufacturing and service sectors. Today, these sectors have been joined by a fourth sort: the successful knowledge sector consisting of knowledge workers. In an progressively more 'smart' automated environment, mental work is moving from crunching furthermore tossing data to creating information and knowledge, and then communicating, exchanging and distributing it with fellow-workers. In short, as it was already noted more than decade ago, mind craft is replacing handicraft (Perelman 1992). The everywhere computer and its related ICT devices have become influential tools for much of the world economy. In this paper a chapter "Practical Geometry" in Teaching of Mathematics subject of the Diploma in Elementary Education of Second Year of Tamil Nadu State Board was taken into consideration. It suggests valuable ways of teaching different types of geometrical concepts such as triangles, quadrilaterals, including cyclic quadrilateral using the dynamic online software GeoGebra. This paper also focuses on illustrations of how GeoGebra can be used for revelation of the above geometrical figures. Besides, this it gives students in visual experiences and understanding the Mathematics subject Geometrical concept in an appropriate way. The ideas introduced in this paper can be further widespread to study of Algebra and Statistics in the second Year Diploma in Elementary Education Course of Tamil Nadu State Board.

**Key words:** Algebra, GeoGebra, ICT Education, Practical Geometry, Statistics

## I.INTRODUCTION

Educational systems around the world are under getting higher apprehension to use the new information and communication technologies (ICTs) to teach students the knowledge and skills they need in the 21st century. The 1998 UNESCO World Education Report, Teachers and Teaching in a Changing World, describes the



essential implications ICTs have for monotonous teaching and learning. It predicts the uprising of the teaching-learning process and the way teachers and learners gain entrance to knowledge and information. To successfully make the most of the power of the new information and communication technologies (ICTs) to develop learning, the following crucial conditions must be met. Students and teachers must have drivable entry to digital technologies and the Internet in their learning environment, schools, and teacher education institutions. High quality, meaningful, and culturally imprudent digital content must be available for teachers and learners. Teachers must have the knowledge and skills to use the new digital tools and resources to help all students accomplish high educational standards. ICT is an „electronic means of capturing, privilege, storing, communicating information. The use of ICT in the classroom teaching-learning is awfully important for it provides opportunities for teachers and students to maneuver, hoard, manipulate, and retrieve information, encourage self-governing and active learning, and self-responsibility for learning such as distance learning, motivate teachers and students to continue using learning outside school hours, plan and prepare lessons and design materials such as course content delivery and give a hand sharing of wealth, proficiency and advice. This adaptable instrument has the capability not only of engaging students in instructional activities to increase their learning, but of helping them to solve difficult problems to enhance their cognitive skills.

## **II.NEED AND SIGNIFICANCE OF THE STUDY:**

Students should experience pioneering technology-supported learning environments in their teacher education programme. Technology can be used to support conventional forms of learning as well as to transform learning. A PowerPoint presentation, for example, can enhance a conventional lecture, but it does not necessarily transform the learning experience. On the other hand, using multimedia cases to teach topics that have previously been addressed through lectures may well be an example of a learning experience transformed by technology. Students should experience both types of uses of technology in their programme; however, the brightest promise of technology in education is as a support for new, innovative, and creative forms of teaching and learning (SITE, 2002). A widespread approach to reach a spreader population of teachers and organizations that are ready to move a small step forward with very limited resources may be helpful at an early stage. Creating centers of transferable excellent practice that encourage 'reference site' visits, and mentoring teachers in other locations, are also approaches that may be effective. This division will appraisal the stages of teacher education and provides examples of approaches for teacher education in ICTs and through ICTs. Therefore it is the need of the hour to know about the ICT tools and it utilities. The method used in this study is Analytic Method.

## **III.OBJECTIVE OF THE STUDY**

The objective of the study is to use ICT tool GeoGebra in teaching methodology of curriculum in Diploma in Elementary Education of the Tamil Nadu State Board.



- i) To integrate the different ways of teaching Diploma in Elementary Education Second Year of Tamil Nadu State Board using the dynamic online software GeoGebra.
- ii) To visualize the mathematical concept in order to create the teaching and learning environment in the class room.
- iii) To analyze the improvement in Mathematical skill in Diploma in Elementary Education students.
- iii) To strengthen the mathematical concept of “Practical Geometry” by showing suitable examples in Diploma in Elementary Education of the Tamil Nadu State Board.
- iv) To assess the improvements in Mathematical co ordination skills among Diploma in Elementary Education students.

#### **IV. ICT –TREMENDOUS TOOL TO VISUALIZE MATHEMATICAL CONCEPT**

Planning the use of an ICT resource will increase the existing topic through some phase of the lessons and tasks. For example, to teach the topic “Practical Geometry” using an electronic whiteboard for presenting practical steps about the above topic a teacher has to plan to complement the lesson with an innovative presentation method to promote class discussion and the visualization of problems and its solutions. But when a teacher adopts a method to use ICT tool viz. GeoGebra the task of presentation is reduced and the role of student’s participation is increased to understand the concepts. The only thing is that the teacher should be well trained to use the ICT tool GeoGebra.

#### **V. BACK BONE FOR TEACHING AND LEARNING –GEOGEBRA**

GeoGebra is a dynamic software package that encourages students to visualize geometric transformations and observe geometric theorems in real-time. It is a free, open-source tool that broadens the study of geometry to integrate algebra and calculus. GeoGebra plays a major role in creating the lively and fruitful environment to understand the geometrical concepts very clearly for all stages of students. GeoGebra is multi-faceted in that it can be used as both a teaching and a learning tool. Teachers can instruct students by providing step-by-step instructions in order that students may construct certain, predetermined figures and/or shapes. In contrast, learners may independently build their own geometric creations using the principles of constructivism to generate knowledge.

#### **VI. COMPLEMENTARY APPROACH**

Using ICT resource online open software GeoGebra to make powerful the pupils’ learning, for example by enabling them to improve their skill by taking notes on the computer or by sending homework by email to the teacher from home, or by word dispensation their homework. All the approaches can increase apprehension, but the effects may be different. In the integrated approach, students’ learning is improved because they are come forward with challenges to their existing knowledge and given deeper insights into the subject being studied.



The fortification approach could improve students' learning through presenting knowledge in new ways, promoting debates among students, and encouraging them to instigate their own explanations.

## **VII. ICT ENHANCING THE PEDAGOGIC PERFORMANCE**

ICTs are said to help expand access to education, prop up the significance of education to the increasingly digital workplace, and raise educational quality. However, the experience of introducing different ICTs in the classroom and other educational settings all over the world over the past several decades, suggests that the full understanding of the approaching educational benefits of ICT. The direct link between ICT use and students' academic performance has been the focus of far-reaching literature during the last two decades. In the second year Diploma in Elementary Education course of duration two years of Tamil Nadu State, Teaching of Mathematics book contains ten units of which unit four is 'Practical Geometry' Teaching the above topic using the dynamic online software GeoGebra the pedagogic performance of the Teacher Trainer is achieved by practicing the tool repeatedly.

## **VIII. OBSERVATIONS MADE DURING INTERVENTIONS**

GeoGebra is open source dynamic online software for teaching and learning was developed by Math Disk Technologies. It can be used to teach various concepts in Algebra, Geometry, and Statistics Vectors etc. This software can be used in online available on multi platforms. It gives a live understanding of mathematical concepts to the students and creates interest and competitiveness among the learners. It also gives practical learning experiences to the students. In this study most important chapter namely "Practical Geometry" in the second year of year Diploma in Elementary Education course of duration two years of Tamil Nadu State Board was taken into concern. Many of the abstract concepts have been clearly explained through concrete examples and diagrams. In particular Construction of Triangles all types, Quadrilateral all types including Cyclic Quadrilateral other theoretical details can be found using the software GeoGebra.

## **IX. MATHEMATICAL VISUALIZATION CONCEPT & ANALYSIS**

To draw an equilateral triangle with given measurements the learner has to open the online software GeoGebra by using the URL: [www.GeoGebra.com](http://www.GeoGebra.com). This open online software is user friendly software in order to create interest in teaching learning process. It also develops the inner personality development of the student to grasp the mathematical concept without any hesitation and fear in the subjects. Based on this technology one has to develop the psychomotor skill in the mathematical subject. It is important to mention that the method of construction will be explained to the students straightaway when we teach in the traditional method of teaching, but when we use the online open software GeoGebra it explains the student visually and secure the practical experiences in this software spreadsheet, command box, graph sheet page plays the major role and the teacher can able to do the animation to create the sparkling learning environment to the student. It is easy to understand the methods of construction. Also we can re-play the procedure until we understand clearly the drawing



methods. In all the figures we can interpret all the values in order to get various geometrical drawing pertaining to triangles, quadrilaterals, trapezium etc. Similarly all the above figures can be drawn and shown in the following diagrams. This diagram helps the student to understand the mathematical concepts in the visualizing manner and it is helpful for the teachers as well as for the students in teaching and learning process. Here come the Illustrative examples to develop the interest in the mathematical subjects:

### 9.1 CONSTRUCTION OF EQUILATERAL TRIANGLE.

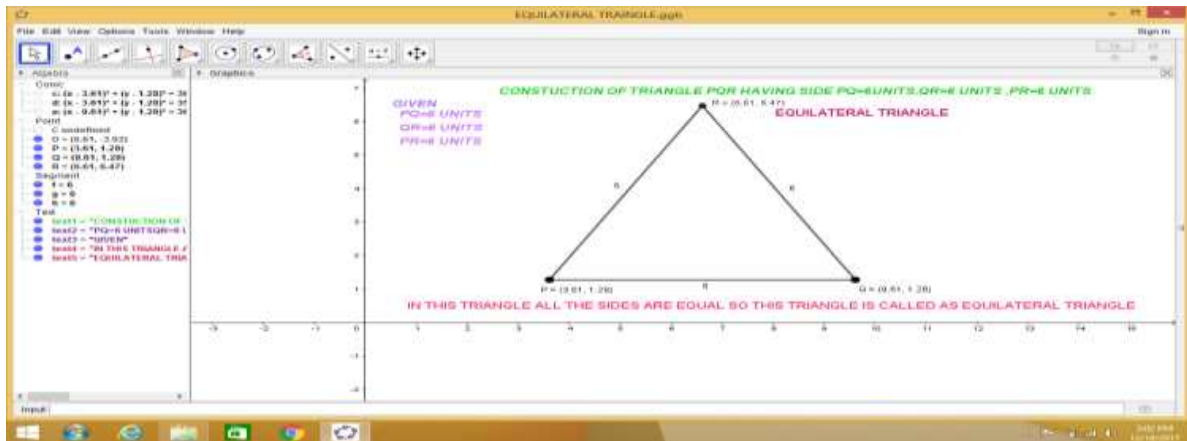


Fig -1

### 9.2 CONSTRUCTION OF ISOSCELES TRIANGLE.

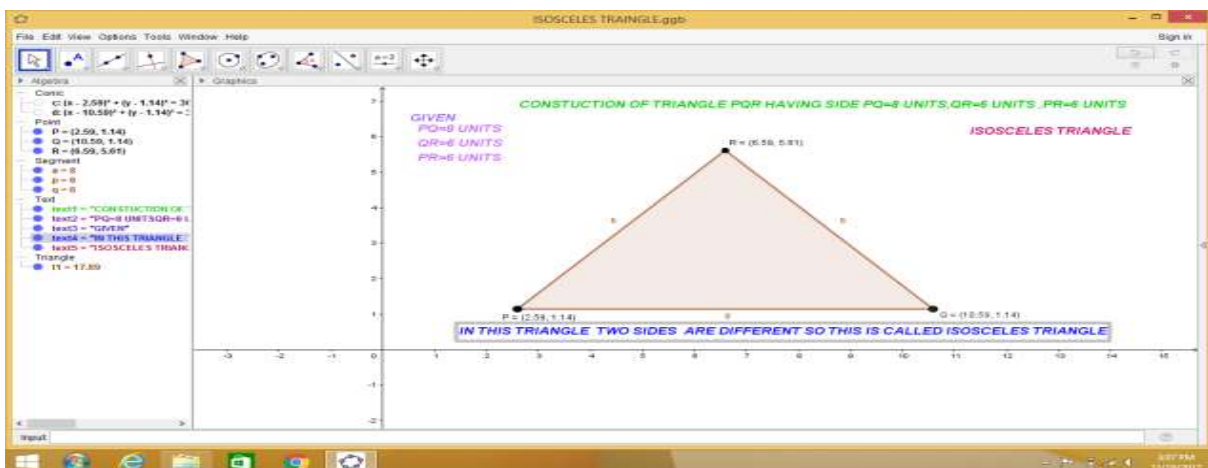


Fig -2





### 9.3 CONSTRUCTION OF SCALENE TRIANGLE

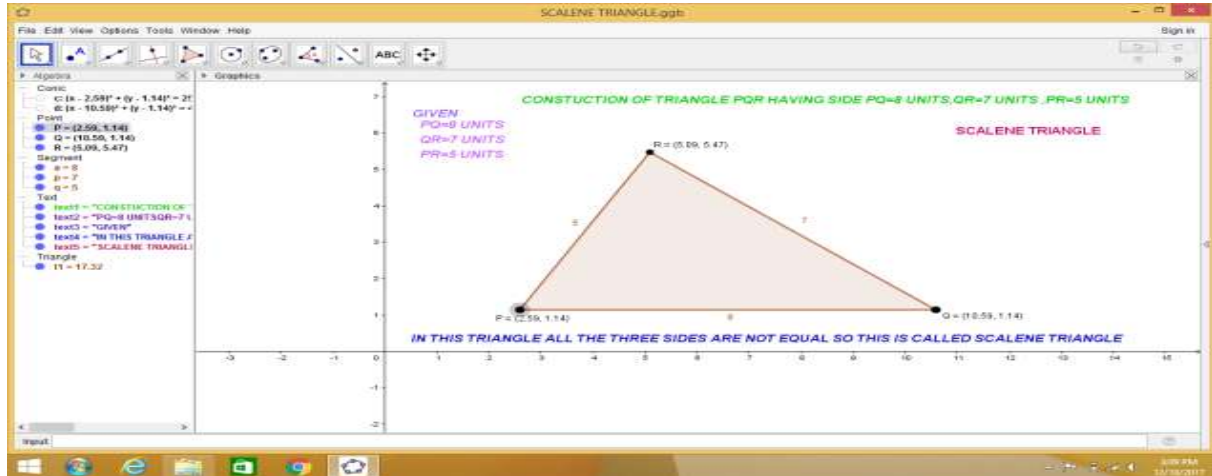


Fig -3

### 9.4 CONSTRUCTION OF ACUTE TRIANGLE

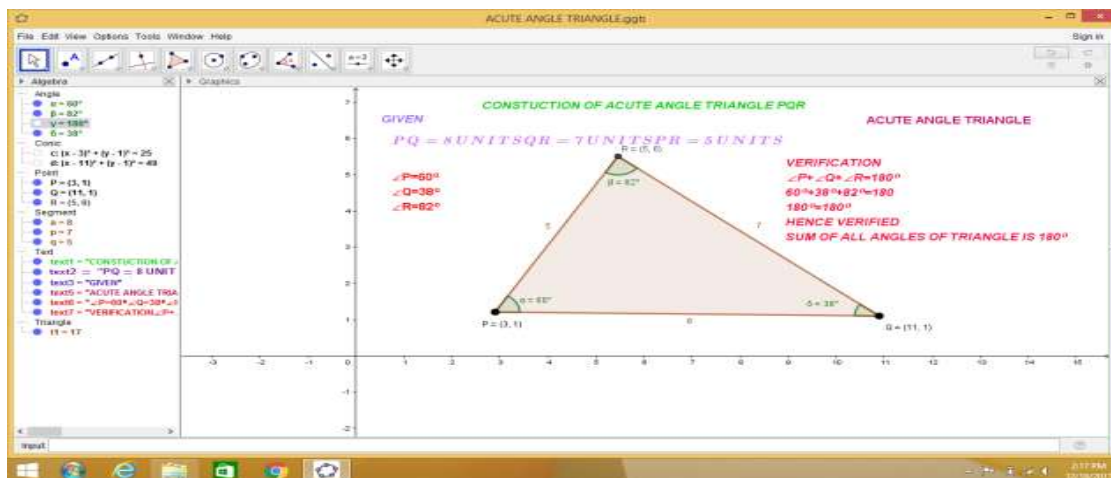


Fig -4

### 9.5 CONSTRUCTION OF OBTUSE TRIANGLE

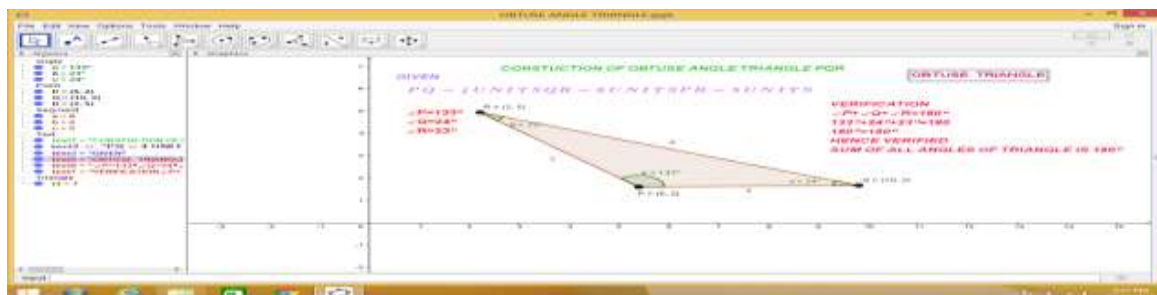


Fig -5



## 9.6 CONSTRUCTION OF RIGHT TRIANGLE

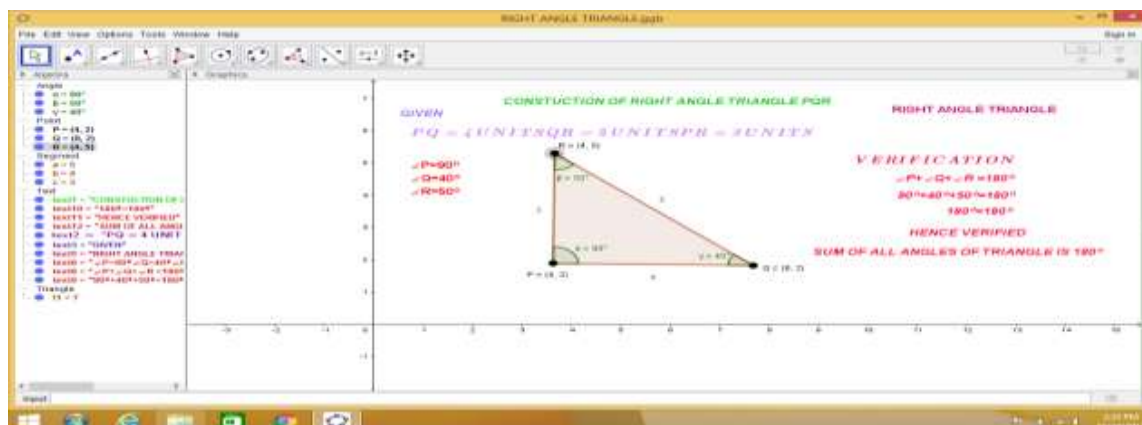


Fig -6

## X. FINDINGS

On observations of all the annexed illustrations we can tabulate the required properties in the following table.

TABLE-1

SL.NO	TYPE OF FIGURE	PROPERTIES	
1	Triangle-Type -I	All sides are equal	Scalene
2	Triangle-Type -II	Two sides are equal	Equilateral
3	Triangle-Type -III	All sides are not equal	Isosceles
4	Triangle-Type -IV	One angle is $< 90$	Acute angled triangle
5	Triangle-Type -V	One angle is $> 90$	Obtuse angled triangle
6	Triangle-Type -VI	One angle is 90	Right angled Triangle.

TABLE-2

SL.NO	TYPE OF FIGURE	PROPERTIES	
1	Quadrilateral-I	All sides are equal and all angles = 90	Square
2	Quadrilateral-II	Opposite sides are equal and all angles = 90	Rectangle
3	Quadrilateral-III	Two sides are parallel and equal	Parallelogram
4	Quadrilateral-IV	All sides are equal and all angles are not = 90	Rhombus
5	Quadrilateral-V	One pair of opposite sides are parallel	Trapezium
6	Quadrilateral-VI	All points of a quadrilateral lies in a circumference of a circle	Cyclic quadrilateral.

## XI. DISCUSSION ALONG WITH IMPLICATIONS:



Teaching is the dyed-in-the-wool application of knowledge, skills and attributes premeditated to provide inimitable service to meet the educational needs of the individual and of society. Collaboration, Cooperation and Cohesiveness are the skills and personality for a teacher. This individuality is helpful to refine traits. Reinforcing and appreciating is a success which comes in a variety of shapes and sizes. Therefore a Teacher as a Mentor must identify the required ICT tool to give method of teaching for understanding the concepts. In this case the dynamic software GeoGebra was selected to teach the curriculum and was appreciated by the slow learners and enlightens the mathematical concept in a fruitful manner.

## **XII. CONCLUSION**

In this study, result and finding concludes that a teacher should come with qualities to be interested in his own subjects and at the same time the teacher explore their ICT concept to other and he has to be the pupils' "friendly" and quite often even something like their friend. Mathematics being an conceptual subject, using the ICT tools gives momentous relief in satisfying the students understanding the concept. In this context teachers have to take up the challenges themselves to create new dimension ideas in teaching mathematics in the chapter "Practical Geometry", so that the goal of the synchronization skills of the student is attained. Therefore a Teacher should improve the teaching technique by learning the new technology, in order to produce quality students. Also it is suggested that a similar study may be conducted on the concept of Algebra and Statistics in the second Year Diploma in Elementary Education Course of Tamil Nadu State Board. Further the professors in engineering college by using the tool GeoGebra to teach the geometrical concept for engineering student in order to create a lively classroom environment.

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