THE EFFECTS OF GEOGEBRA ON MATHEMATICAL MODELING: ENLIGHTENING PROBABILITY DISTRIBUTION LEARNING

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Abstract :
Many researchers recommended that information and communication technology (ICT) is a very useful tools for transforming and becoming effective and attractive teaching learning process but in our country it will more effective and uses by teachers during the last few year specially during the pandemic ICT tools is very helpful for becoming teaching learning process more easy. In mathematics classroom ICT can help teacher and student to learn or perform data analysis, probability, statistical tools, algebraic equations and coordinate geometry and 3D-graphics of geometry. The mathematical activities done by many ICT tools like Microsoft mathematic, statistica, Photo math, GeoGebra etc out of this GeoGebra one of the most useful software for school and college level students. In this paper we focused one of the best tools probability distribution and their practicable application with the help of GeoGebra.

Keywords: open source software GeoGebra, Probability distribution, Mathematical Modeling.

Introduction: As per the requirement of generation we want to change the methods and pedagogy of teaching and learning process. The world of education forwarded to the direction by the using of information and communication technologies, because in the context of current scenario the demand of the society increased by day to day. Why we are behind, why not use a technologies and ICT tools in the world of mathematics to make our teaching and learning process better and better. In the current situation, we need to make the teaching learning process more effective and interactive. In Malaysia, major investment in ICT has been implemented to achieve effective and advanced teaching and learning in the classroom. Malaysian Ministry of Education (MOE) has seen the application and the use of ICT in education in Malaysia as the key efforts to create knowledge – based workers which later will generate the economy (Ismail, 2008).

Revival in economic activities and growing consumer demand has played a key role in the growth of information and communication technologies spending with enterprises changing focus and business model to deliver digital first experiences. Indian enterprises will be spending $91 billion on information and communication technologies (ICT) in 2021, marking a 10% increase that last year. Now days many applications are available for effective and innovative teaching and learning tools for mathematics. For Example MAPLE, MATLAB, Microsoft Mathematica, JsMath, Geometer's Sketchpad, Derive, Cabri, Statistica, Autograph and other. These mathematical software have been used in research scholars, college and school level students for explore their concept of mathematics, but out of these software we need to purchase for using their tools and out of them some of the software are really very costly. But some of these software is available for free which we can use for our classroom teaching. As of June 2022 approximate 502,000 open source projects and software that have been registered in SourceForge.net. Software which are similar to open source software and related to mathematics instructions such as Axiom, MAXIMA, GAP, Cadabra, CoCoA, Xcas, Geo-Gebra, Modelica, octave etc .

About Geo-Gebra Software :
In the present we select the open source software GeoGebra for the mathematics teaching learning process. GeoGebra one of the best open source software for learning the various mathematical object. They give a full facility to use various mathematical tools like Coordinate geometry with properties, Algebra, Calculus, statistical tool, probability distribution in both numerical and graphical form. This software can be freely available and downloaded in our PC and android phone all over the world form the their official GeoGebrawebsitehttps://www.geogebra.org/download?lang=en for android and

https://www.filehorse.com/download-geogebra/ for PC latest 2022 version available. GeoGebra is one of the best interactive mathematics software for teaching and learning methodology for engineering, economics, Science, technology and mathematics for the students. Constructions can be made with points, vectors, segments, lines, polygons, conic sections, inequalities, implicit polynomials and functions, all of which can be edited dynamically later. Elements can be entered and modified using mouse and touch controls, or through an input bar. GeoGebra can store variables for numbers, vectors and points, calculate derivatives and integrals of functions, and have a full complement of commands like Root or Extremum. Teachers and students can use GeoGebra as an aid in formulating and proving geometric conjectures.

Main features of GeoGebra's are:
1. Interactive geometry environment (2D and 3D)
2. Built-in spreadsheet
3. Built-in computer algebra system (CAS)
4. Built-in statistics and calculus tools
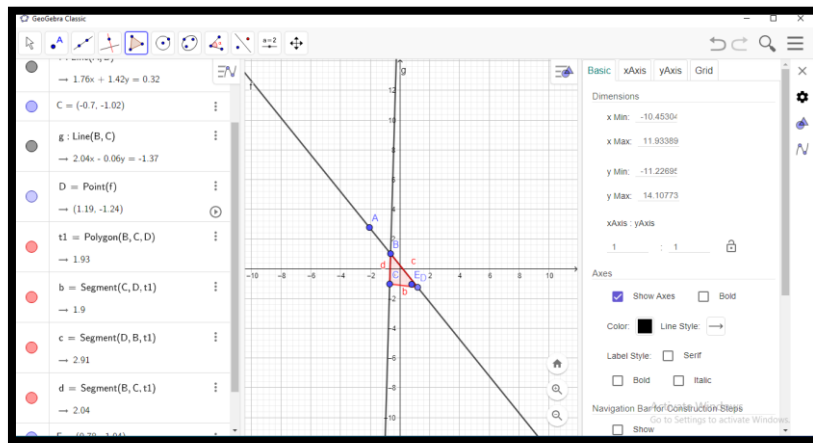5. Probability Calculator
6. Construction protocol

Figure 1 : GeoGebra Software

Theoretical frequency Distribution: when frequency distributions of some universes are not based on actual observation or experiments, but can be derived mathematically form certain pre-determined hypothesis, then such distributions are said to be theoretical distribution.

Types of theoretical Distribution: There are several types of theoretical distribution but we can usually used two type of distribution in statistics.
1. *Discrete probability distribution*:
a) Binomial Distribution
b) Poisson Distribution
2. *Continuous probability distribution:*
a) Normal Distribution

Research objective
The objectives of this study are as the following
1. The objective of this study is to explore some useful tools of GeoGebra which is use full for teaching learning process for teacher and students.
2. Illustrating the practical application of probability distribution in our daily life with the help of GeoGebra
3. Discuss various types of probability distribution and the differences in GeoGebra.
4. Understand the various probability distribution tools and their uses with the help of GeoGebra

Methodology
In the current research work we collect one application survey of binomial distribution and perform it on GeoGebra we take a sample of 500 people at the same age and social class join the life insurance of some insurance company. On January 1, each of them pays 50 insurance expenses to the company, and the family members can receive 12 thousand insurance benefits from the company when the insured dies, then the death probability within one year is 0.025, then the probability of the insurance company losses money is

$$P(X = K) = C_{500}^{k}\, 0.025^{k}\, (1 - 0.025)^{500-k} = 0.784$$

Therefore the insurance company "benefits a lot" and basically will not lose money.
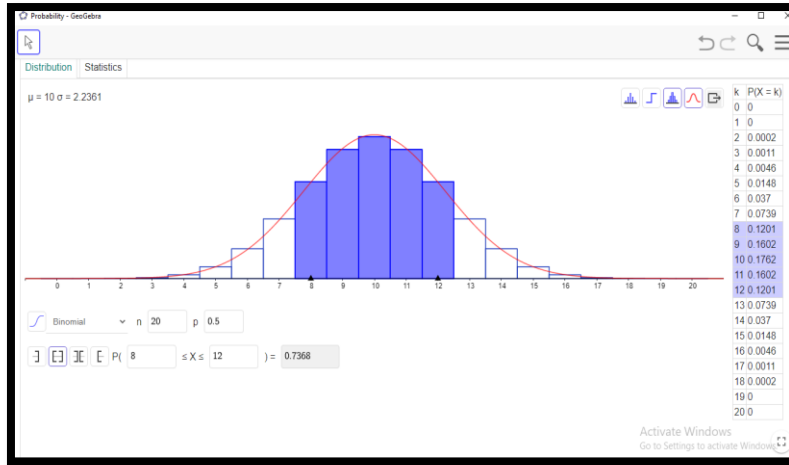
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Figure 2 : Binomial distribution calculation in GeoGebra

In the same manner we can calculate all the statistical data and distributions in all different cases like chi-square, f- distribution, Exponential distribution etc. see Figure .3 and 4.
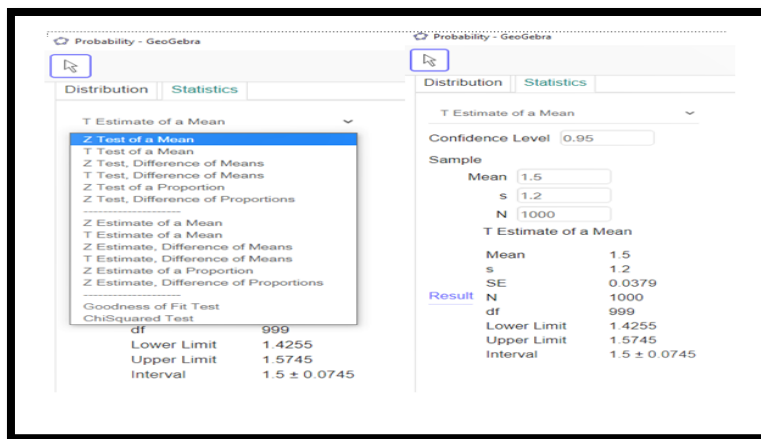

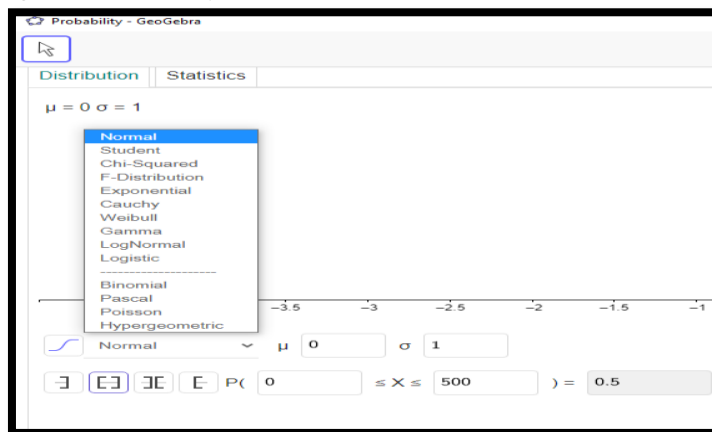Figure:3 Probability distribution calculation window in Geo-Gebra

Figure: 4 Statistical calculation window in Geo-Gebra

Conclusion

GeoGebra is one of the best platforms for teaching learning process of mathematic in school and college level students. There is a software in which we can solve mathematical problems as well as visualize it so that students can easily understand the problem of mathematics. It provide dynamic, interactive and friendly environment to the students and help to increase their cognitive thinking power like creativity. This software provides students and teacher many more tools and technology and new way of understanding mathematics with theoretical as well as visual aids to help students to interact with the mathematical concepts individually or in groups in the classroom or

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home or at the most convenient place according to the needs of the teachers and students using computer.

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