Please find the Statistical Learning Discussion Question below, kindly participate actively in the discussion thread to share insights and perspectives with your classmates.

**Analyse, Criticize, and Explain:**

"We learned three distributions: Normal, Poisson and Binomial. Normal distribution looks more common in real world. Poisson and binomial seem to be there only to satisfy a few theoretically-oriented statisticians."

Rules to be followed:

* The word limit is 200 words.
* You are asked to reflect on and respond to the above question and post your views on the discussion forum.
* Your replies/answers should be thoughtful & add value to the discussion.
* You are to write your opinion about the topic in discussion and your response should have some originality.
* You should refrain from posting any definitions of theories & concepts.
* We also encourage you to read the postings of your peers and respond to at least one of the postings.

**Answer:**

**Normal Distribution**  
  
Normal distributions also represented as a Bell Curve is generally a symmetrical distribution. The data points are placed in the symmetrical curve based on their matching criteria. The graph of the normal distribution depends on two factors - the mean and the standard deviation. For example if we have an entrance test and 10 % students scored A, 40 % students scored B, 40 % students scored C and rest 10 % students scored D then they are plotted in a symmetrical curve. This distribution can be further used in the field of physical sciences, social sciences, biological sciences, engineering, and on and on. Properties of a normal distribution:  
  
The mean, mode and median are all equal.  
The curve is symmetric at the center (i.e. around the mean, μ).  
Exactly half of the values are to the left of center and exactly half the values are to the right.  
The total area under the curve is 1.  
  
**Binomial Distribution**  
  
A situation where we need to determine the probability of success or failure on a fixed number of events or occurrences we can use binomial distribution. A binomial experiment is a statistical experiment that has the following properties:  
  
The experiment consists of n repeated trials.  
Each trial can result in just two possible outcomes. We call one of these outcomes a success and the other, a failure.  
The probability of success, denoted by P, is the same on every trial.  
The trials are independent; that is, the outcome on one trial does not affect the outcome on other trials.  
  
**Poisson Distribution**  
  
The Poisson distribution is popular for modelling the number of times an event occurs in an interval of time or space.  
  
For instance, an individual keeping track of the amount of mail they receive each day may notice that they receive an average number of 4 letters per day. If receiving any particular piece of mail does not affect the arrival times of future pieces of mail, i.e., if pieces of mail from a wide range of sources arrive independently of one another, then a reasonable assumption is that the number of pieces of mail received in a day obeys a Poisson distribution. Key assumptions for the Poisson model include:  
  
The random variable counts the number of events that take place in a given interval (usually of time or space)  
All events take place independently of all other events The rate at which events take place is constant usually denoted.

**Summary**

All 3 forms of distribution have their own areas of usage.

Generally, where we have finite number of observations or data points we can use Normal Distribution.

Binomial distribution can be used when there are fixed number of outcomes of any activity. E.g. coin toss can have only 2 outcomes. For the Binomial you would need a fixed number of trials (365) and a known failure rate per trial.

For the Poisson you need a known interval (365 days) and a known failure rate (average failures per day)