<u>Background of the I-Pod Simulation</u>
Suppose there are N people with M songs on their I-Pod. For our purposes, these M songs will be the same for all N people. Each of these N songs, will be assigned a random number in the interval [0, 1] and these numbers will sum to one. These numbers represent the probability that the user will play the song at a given time. The I-Pod Simulation process takes place as follows:

1. At each timestamp, two random people are selected from the group of N people.
2. The two people play their favorite song to each other. A user's favorite song, is the song with the largest probability.
3. After hearing the other person's favorite song, each user's value for the other person's favorite song goes up by an arbitrary value η, while the remaining songs are scaled by 1-η to ensure that the sum of probabilities continues to sum to one.
4. The process repeats for a set number of shares.

As an example, suppose Person x and Person y are selected from the group of users. Suppose Person x's favorite song is i and Person y's favorite song is j. Person x will play song i to Person y and Person y will play song j to Person x.

As a result of these song shares, Person x's value for song j and Person y's value for song i will both increase by a value of η. The remaining M-1 songs are multiplied by (1- η). This ensures that Person x and Person y both have probability distributions summing to one.

<u>Standardized Time</u>
Suppose N = number of people and S = number of shares. Therefore, there is an average of 2S/N interactions per person. The model we are working with also has a parameter η which contains the value of the "effect" of each share. Thus, we can think of the effect of S shares on an individual as being (2*S/N) * η. This motivates the following definition of "standardized time":

$$1 \text{ "standardized time unit"} = 2S\eta/N$$

For example, suppose we have a simulation with 250 users (i.e. N=250), η = 0.1, and 2000 shares (S = 2000). We would thus have "standardized time = (2*2000*0.1)/250 = 1.6. As such, we would have the x-axis as 1.6 instead of 2000 and label the x-axis as "Standardized Time" instead of "Number of Shares."