

THE LAW OF HUMAN PERFORMANCE OR OF PRACTICE
(An Extension of the Power Law of Performance or of Practice)

The Power Law of Human Performance or of Practice (PLP) states that the time (**T**) it takes an individual to perform a given, simple task decreases as the number of times (**N**) the individual practiced the task increases. In mathematical terminology, the law is follows (*Education Vol. 115, No. 1, 31, 1994*). NOTE: It is not necessary to understand or know this formula to follow the law. Please see the bar graph on the next page. It totally displays how **T** gets smaller as **N** increases.

$$T = A + B (N + E)^p \quad \text{or} \quad T = A + B/(N + E)^p,$$

where A, B, E and p are constants that vary (**a**) with the task at hand and (**b**) with the individual performing the task. A represents a physiological limit. B and E partly denote prior experiences before the beginning of the practice sessions, and p is the learning rate. In other words, the law states that “*practice renders perfect.*” This law applies to the performance of *sensory-motor (or athletic), creative (or artistic), and cognitive (or intellectual) tasks.*

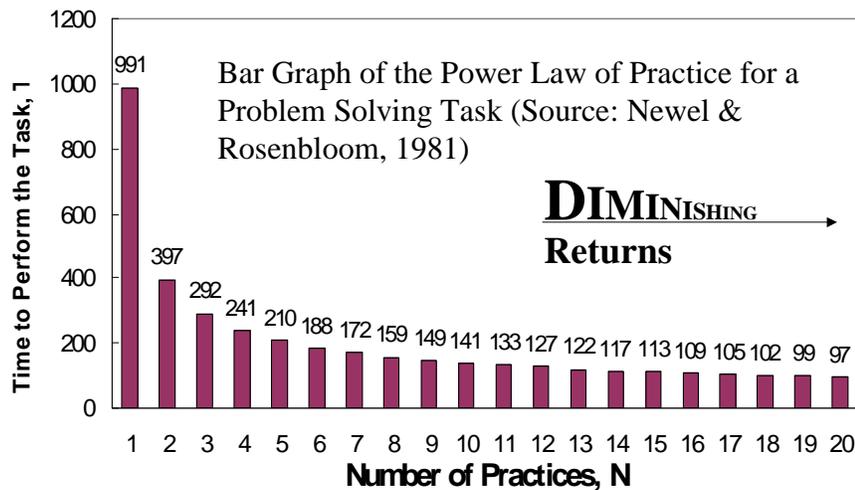
The shorter the time T to perform the task, *completely and correctly*, the higher the level of proficiency is. *Hence, as the number of practices increases, so does the proficiency of the individual.* The figure below graphically shows the plot of the above expression for a problem solving task.

The dramatic impact of this law becomes apparent when one considers its application to several tasks and over several days, months, and years. Then, it becomes clear that *genius is mostly the result of sustained, competitive practice (efforts).* The same way adequate practice, at an adequate scope and depth, is needed for the making of Olympic, National Basketball Association, National Football Association, and Major League Soccer champions and for the making of musicians and artists, the same way it is needed for the making of science, engineering, and mathematics scholars, including scholars in the social and behavioral sciences. This assertion holds for the making of scholars in any discipline.

Further, this law is implacable. It applies whether one likes it or not! It applies to the refinement or the enhancement of the *teaching*, mentoring, research, and writing skills of a teacher or faculty member! These points are discussed, in the publications given below, in connection with the explanation of the creation of educational value-added *from pre-K through graduate school and beyond.*

The integrated law of human performance or simply the *law of performance* (*Education*, Vol. 115, No. 1, pp. 31-39, 1994) is the convolution of the power law of performance as simultaneously applied to several tasks over a long period of time. The main difference between the *power law* and the *law* is that the former follows a simple equation that involves an exponent or power (i.e., p) while the mathematical form of the latter is yet to be determined. *The quintessential point here, however, stems from the fact that according to the law of human performance, the abilities, skills, and attributes of students that are meaningfully engaged and challenged in and outside the classroom (as by assignments and mentoring activities) — from pre-K through graduate school and beyond — are the ones that develop!* The law of human performance provides the scientific basis for high expectations for all students! Professional mentoring, as defined elsewhere by Bagayoko, provides an almost fail-safe strategy for promoting the academic excellence of all students (female or male, minority or non-minority, young or mature). *It is critical to note that the same way the ILP applies to the cognitive domain, the same way it applies to non-cognitive (i.e., behavioral) variables. Character is molded through practice. Study skills are acquired through practice.* Also see *Education*, Vol. 115, No. 1, pp. 11-18 & pp.19-25, 1994.

[For more information on the Power Law of Human Performance, please see: Handbook of Perception and Human Performance, Volume II, Ed. by Kenneth R. Boof, Lloyd Kaufman, and James P. Thomas, 1986. See pages 28-71.]



The larger the number of practices (horizontal axis), the smaller the time to perform the task correctly—regardless of gender, ethnicity, socio-economic status or hair style! **THE TIME ON RELEVANT AND PROPERLY SEQUENCED LEARNING TASKS IS THE KEY.**

Source of Data in the Graph: Newel, A. and P. S. Rosenbloom (1981). "Mechanisms of Skill Acquisition," Edited by Anderson, J. R. Hillsdale, N. J.: Erlbaum

THE LAWS IN ACTION

(B and E relate to the background of the trainee, student, individual!)

- Please note that A and p are generally in the same range for most individuals not suffering from a severe physiological or mental impairment. Hence, provided an individual gets N sufficiently large, for a simple (or elemental) task, that individual can attain any degree of proficiency in the performance of that task.
- Please note that **B** denotes prior experience **not favorable** to the performance of the task at hand. A large B means that a much larger N (more practice) is needed to attain the level of proficiency of someone with a smaller B. Example: habits of improper grammar in daily language impede the mastery of a language (i.e., English in our case). **Oh, the more that improper grammar is utilized (practiced), the more it becomes a second nature**, irrespective of ethnicity, gender, income, parents' education, hair style, etc.
- Also note that a **large E** denotes prior experiences that **are favorable** to the performance of the task at hand. Example: the knowledge of irregular verbs and the daily use of proper grammar speed up the learning of English. Similarly, the mastery of the content of Algebra I facilitates the learning of Algebra II. **And, of course, reading fluency and text comprehension facilitate most aspects of formal learning in school, in any subject.**
- **E leads to proper sequencing in curricula and lesson plans. N leads to homework assignments in light of the classroom time limitations (in all countries).**

Provided adequate time is devoted to learning and practice (homework) in a course, from its beginning, serious difficulties in that course, for a student, have generally little to do with any "lack" of smartness, but have much to do with the lack of some background knowledge or skills!