

daily communicative behavior could be timed and counted. We know that people have circadian rhythms—how about weekly, monthly or seasonal undulations in concepts communicated per minute? Perhaps at the next Winter Precision Teaching Conference in Orlando we can discuss some of these possibilities.

See you there!

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### CONSIDERING STANDARDS

Eric C. Haughton

Performance standards! Who needs them?

Don't we have enough challenges in our day to day activities without introducing this nettlesome issue?

Exactly my own train of thought, or non-thought, about this topic unit, . . . At this point a montage of behaviors floods my inner eye, as I see people expected to perform, but inexplicably, could not. Searching backward and forward in their behaving systems, we (co-workers and myself) often found a key prerequisite performance either absent or else profoundly deficient.

Such findings, of profound lacks or deficits, led us to analyzing what we knew about performance-based decision making. Ten years ago this was a radical question as curricula decisions (for example) were largely based on quality considerations and/or were peer-norm referenced in our traditional, commercial standardized tests. Since performance decisions in our programs require specific, precise and topical data on both quantity and quality, we obviously had precious few performance references for our decision making.

That we have few reference standards in the Behavioral Sciences places us in marked contrast to other major human service providers. Concerned professionals in medicine, architecture and construction, transportation, nutrition and electronics are concerned about various standards influencing the quality of our lives. Not that there isn't more work to be done, enforcement improved and many refinements desired in this

crucial area. We now take for granted, however, 37° Celsius or 98.6° Fahrenheit, resting pulse in the 60 to 80 beats per minute range along with 10 to 15 respirations per minute as some of the indicators of adequate health. A lengthy listing of all the normal ranges of indicators signifying physical health is available. Those ranges are fairly well understood as are physical consequences resulting from being outside the range along with effective options for remediating debilitating deviations. On the other hand, suppose we require a such firm frame of reference in reading, writing or arithmetic? Until recently we have had no established performance standards against which we could compare our client's data. (Note: We require performance data not references that are related to such irrelevant factors as age or grade level.)

An early example of this dilemma occurred in my work about 1970 when, puzzled about some decisions required for grade one and two reading projects, I remember asking Clay and Ann Starlin what levels we could consider adequate in oral reading. Their best estimate was about 80 words correctly pronounced per minute. We needed a performance standard to guarantee children's successful progression in reading. Now, after many explorations based on performance and learning measurement, we know that preschoolers easily exceed 300 words per minute in the See text/Say words channel on practical and, practiced materials. These recent data underscore the retarding consequences of referring to age or grade averages when we need refined definitions of proficiency or fluency.

As many of you know, 80 words per minute exceeds 1982 grade one peer-norm referenced measurements by about x1.6. We, who are concerned about performance standards that insure proficiency, are required to learn what to expect from our performers and not from external data commercial sources. We learn about performance requirements from continuous assessment work with our cooperating behaviors. Skilled people are like a carefully woven, beautifully symbolic tapestry—a wrap and woof of smoothly synthesized fluent performances.

The idea of relating to "standards" usually produces a mixture of interest, positive inferences, negative feelings, along with considerable trepidation. Quite a mixture! Such a mixture of inner reactions can combine to cause us to veer away from the issue. For good reasons too!

One of the most intriguing stories exemplifying the puzzle of our mixed feelings toward standardization relates to the habitual arrangement of our typewriter keyboard. My typing involves a QWERTY keyboard, established

by international agreement in 1905. This article has been prepared for publication on a 1982 micro-computer word processor, also using the QWERTY keyboard! Now, typewriters in 1905 were run by a sort of spaghetti-like maze of connectors which frequently jammed, even at low typing speeds. These machines especially jammed up as typists shifted from two fingered hunt and peck typing style (popular in the early 1920's) to deciding to memorize the keyboard and to using all eight fingers to cover the typewriter's keyboard. Our QWERTY keyboard underwent careful design to slow down overzealous typists. Then, in the 1930's, Dr. August Dvorak decided to improve the effectiveness of the typewriter.

A simple time and motion study combined with a letter frequency analysis, along with improvements in mechanical design promised to revolutionize typing as a communication skill. The Dvorak Simplified keyboard places vowels on the "home row," thus increasing the number, as well as the frequency of words typed in this position. A Dvorak keyboard increases x30, (from 100 QWERTY to 3,000) words typeable on the home row. Most prefixes and suffixes become available on the home row, too.

Further effectiveness occurs because instead of the left hand typing about 56% in the QWERTY arrangement, the right hand takes 54% of the work load in the Dvorak Simplified keyboard. As you might expect, typing frequencies increase by about 35%. Furthermore, finger travel for skilled typists is reduced by a factor of 20 from about 30 kilometers (20 miles) per day to 1.5 kilometers (1 mile).

Figure 1

**KEYBOARDS—home row configuration**

1932 DVORAK Simplified  
a o e u i d h t n s  
(3000 words)

1905 STANDARD QWERTY  
a s d f g h j k l  
(100 words)

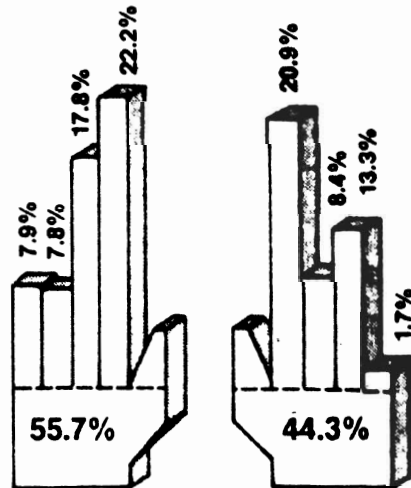
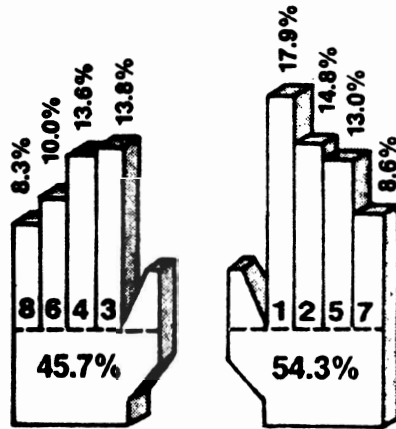
A more recent British ergonomic modification puts the thumbs to work on six keys, as well as operating the space bar. This ergonomic design, moreover, is angled crescent shape allowing our arms to operate in a comfortable, angled position, rather than pressed firmly to the body as required by our rigidly aligned linear keyboards.

So, here is the enigma which exemplifies some of

Figure 2

Work load distribution comparison between the Dvorak and the standard QWERTY keyboard

**DVORAK SIMPLIFIED KEYBOARD**



**STANDARD KEYBOARD**

our classic, confused emotional reactions to the topic of standardization. In 1932, we could have shifted to a keyboard that is easier to learn, facilitates typing in several ways and allows for increased performance. Yet, today, even micro-computers require a \$200 keyboard enhancer card to allow you to use this (or any other personal) arrangement of keys. We are still stuck with an arbitrary, outmoded, inefficient and error-producing keyboard layout. Resulting from a decision to standardize the keyboard almost eighty years ago. How could such a disaster occur? Mainly because we lack necessary processes and procedures to manage standardization.

So, if you approach this topic of standardization with mixed feelings, imagine how August Dvorak felt, when, at his death in 1975, no significant moves had been made in such an apparently simple and well-documented area as the typewriter keyboard. This is an amazing example of how agreed-upon standards have retarded progressive, desirable developments. And yet, there are many examples of how standardization contributes to our comfort, health and security, especially in health and physical areas.

Determination of performance standards requires effort and so does their implementation into our daily lives. Such challenges confront established attitudes, current practices, technical habits, "old wives' tales," economic factors as well as some of our fundamental values. Therefore, the topic of performance standards is complexly puzzling, even potentially terrifying.

In this series of articles, we will explore this stimulating and challenging topic, and the various aspects and concerns related to human performance standards. I welcome communication and contributions from others concerned about and/or working in this area. My plan is to discuss such aspects as quantity and quality criteria, decision making, simultaneous and sequential implications, the role of prerequisites in developing behaviour patterns, as well as to explore various stages and techniques for studying and establishing meaningful standards. Furthermore, in the next article I will illustrate how peer-normed performance referencing contributes to retarding, even disabling each of us and our developing students.

Little is yet known in this crucial area of human performance development—especially in schooling and academic areas—and so, my hope is that we will cooperatively investigate this topic together to expand and refine our knowledge. This is a topic whose effects determine the consequences of each project or intervention conducted by us in the interest of our trusting clients.

#### Position Available

The Rehabilitation Institute of Chicago, a private, non-profit hospital affiliated with the McGaw Medical Center of Northwestern University and specializing in the rehabilitation of physically disabled individuals is accepting applications for a Research Associate to serve in the Learning Research Unit.

Required skills include exceptional fluency in Precision Teaching with the Standard Celeration Chart and in the Experimental Analysis of Behavior as it applies to a multidisciplinary rehabilitation setting. This perspective must be accompanied by skill in facilitating the use of behavioral technology by persons of widely differing theoretical orientations. Desired are experience and skills with microcomputers, programming, electromechanical transducers of movement, statistics, scholarly writing and consulting. Responsibilities include design and execution of research projects that elucidate the relationships between events (especially in therapy) and changes in the behavior of persons undergoing rehabilitation. Ph.D. with hospital experience desired, ABD considered. Salary competitive. Please send vita to:

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