Practicing Practices: Learning by Activity

Dr. Eric Christian Haughton
Loyalist College

Abstract: This paper presents information on our lack of attention to three major performance variables: practice, proficiency and application. Due to our lack of appropriate criteria we are grossly underdeveloping learners' skills, therefore adversely affecting their knowledge and their applications to various challenges. Four factors related to appropriate practice conditions, specifically: (i) quality, (ii) proficiency goals, (iii) channels and matrixes, and (iv) durations and intervals, are analysed, exploring various practices and some programming implications. The point is made that without appropriate performance criteria we are allowing inadequate levels of performance to pass as acceptable. Learners face unfortunate consequences when they experience difficulties retaining, exhibiting endurance and attempting to apply skills and knowledge they've been evaluated as possessing, yet are well below essential performance levels. The paper points to a resolution of this crisis in learning based on critical quantity and quality criteria along with appropriate amounts of and combinations of practice.

Introduction

Our practical and research attention to improving behavioural management focused on the importance of stimulus and consequence management for the last quarter century (Lindsay, 1964, 1972). Thus we, like much of our society, have overlooked the crucial importance of establishing effective practice conditions to thoroughly develop essential quantities of quality behaviour. For example, during much of our efforts during the programmed instruction phase, a few accurate responses counted as adequate for performance development. An unspecified amount of "reinforcement" in the form of accuracy feedback was supposed to cement information gains. Later, the field turned its attention toward the benefits of various contingent reinforcing conditions (Haughton, 1967). During these concentrations of professional perspective reflected in our practical and research efforts, we acknowledged the crucial importance of, yet neglected, intensive practice.

We all know the old saying, "Practice makes perfect." Now, with our refined concerns, we might rewrite this to a updated "Efficient practice develops proficiency." While previous concerns related to a student becoming "perfect," we now realize that a skillful, competent or proficient person is in better shape than one striving for some absolute notion of perfection. Perhaps we have learned, as did Jonathon Livingstone Seagull, that attaining "perfection" is a process rather than an end? Therefore, we strive to improve our own skills and knowledge or to establish appropriate conditions for others to achieve proficiencies.

Appropriate practice conditions include proper stimulus and consequence management, yet, while these are necessary conditions, they aren't sufficient conditions. An enormous amount of appropriate practice, often including thousands of repetitions, is a condition for effective skill development.
When conditions of practice, our practising practices, are insufficient, the
performer falls to reach appropriate levels of performance and may suffer
various consequences. While numerous aspects of this complex issue could be
explored, we will briefly check three significant implications of inadequate
practice.

One important consequence of inadequate practice lies in the person's
failure to retain adequate quantity and/or quality performance during periods
of non-use. Having learned a skill or behaviour pattern, then failing to use
it for a extended period, you could be in serious difficulty upon finding
yourself needing the performance but discovering you've forgotten how to act.
Once skilled in swimming, for example, you would be in serious trouble when
boating and discovering that you've forgotten how to swim. This could happen
if the skill was inadequately established originally, in part due to
inadequate practice. While there may be fairly rapid relearning, it is
inefficient (or even dangerous) to lack a previously held performance.

Secondly, we know there is a relationship between quantity of
performance and endurance (Binder, 1980; Higdon, 1980). Higdon's article
analysed the beneficial consequences of marathon runners logging over 180 km
per week while training for marathons. Binder analysed the relationship
between levels of performance and capacity to maintain performance over
extended periods. In general, he found that higher levels of performance
sustained performance levels, whereas lower performance related to greatly
decreasing performance over time. Therefore, we need to ensure that learners
experience enough of the right types of practices to meet the dual
requirements of sufficient performance levels along with performance
durations to ensure useable performance endurance.

The third aspect lacks a thorough data base, so my hope is that further
field and theoretical work will continue to explore the relationship between
capacity to apply skills and knowledge, and several levels of skill
acquisition. There appears to be a differential effect when we study the
consequences of shifting from a simple task to one that is more complex. Low
quantity on the simpler skill will result in lower performance on more
complex tasks (Barrett, 1979; Haring & Gentry, 1976; Haughton, 1972). My
"Aims" article illustrated the decrements in more complex tasks caused by two
types of inappropriate decision making: (a) too low basic skill performance
illustrated by Robert's performance, and (b) Mikal and Ronald's data showing
some consequences of too low performance aims. The Haring and Gentry data
show the differential effects of low basic skills as curriculum demands
increase. Barrett's data graphically compares the rates of three groups of
people in 16 basic skills. State school students experiencing developmental
delay perform somewhat below regular 5- to 7-year olds and adults. The
effects of low prerequisite skills are clearly differential, being related to
lower complex skill performance. For example, regular adults wrote ones
(Think/Write 1's) at a middle frequency of about 210 per minute, writing
fours (Think/Write 4's) at about 100 per minute. This divide by 2.1
decrement can be compared to a performance loss of divide by 12 for
institutionalized people aged 12 to 54 who performed Think/Write 1's at
60/minute and Think/Write 4's at 5/minute. These three examples illustrate
the differential effect of low correct frequencies on prerequisites. Even
greater differences are measurable when comparing performance on more complex
tasks.
Hopefully, this brief overview of three issues relating to the importance of adequate practice will serve, allowing us to explore several dimensions of appropriate practice useful in avoiding these unfortunate performance consequences. Perhaps it is unnecessary to point out that there are a multitude of factors relating to performance development, so we will examine only a few. Those that will be discussed are: (i) adequate quality, (ii) proficiency goals and practice ranges, (iii) channels and matrixes, and (iv) durations or intervals. These topics cannot be divorced from our traditional topics of effective stimulus and consequence management, so although these won't be specifically discussed, you will understand that we assume effective handling of these programatic features. In this way we can isolate our discussion to the four intriguing topics just mentioned.

1. Adequate Performance Quality

We cannot develop performance without a base of moderate quality. Too much emphasis on quality, however, will reduce both the quantity produced and the rate of improvement. Therefore, much care must be exercised so that the learner is not intimidated by over-emphasizing quality criteria.

Although much contemporary evidence exists, I will refer to an old source, an antique penmanship booklet (Bailey, 1910) where it states:

Speed is an important factor in the production of good writing. Slow writing, except when done by an expert script writer, is heavy, wavy, irregular and inaccurate. Fast writing is frequently illegible. Between these two there should, therefore, be a happy medium. That rate of speed which enables one to make two hundred down strokes per minute in a movement exercise is the rate that will produce those light, even, accurate lines that people admire so much in the penmanship of the master artists. All work should be done at the same speed if you expect to become a good penman. Do not have one speed for movement exercises and another for letters and words. When you have cultivated a smooth movement and an even speed, your writing will be both pleasing and legible.

Furthermore, coaching instructions in art, dance, acting, music and various athletics encourage the initial development of relatively high frequency acts before requiring refinement of the desired movements. Often these directions include warnings that too much attention to quality, early in performance building or acquisition, will inhibit performance development.

2. Proficiency Goals and Practice Ranges

For some time, those of us involved in Precision Teaching and some segments of Applied Behaviour Analysis delighted in producing change as well as improved learning patterns. Our use of frequency or rate as our form of data did not involve searching for relevant criteria levels of performance related to such critical factors as retaining, enduring and applying skills and knowledge. We were, however, by the 1970's (Haughton, 1972; Kunzelmann, 1970) collecting some suggestive data indicating that certain levels of performance in one topic related to success in other areas. Certainly the data are not all in; much more work will be done furthering our awareness and our understanding of this complex issue. A growing realization that we are dealing with several inter-related factors such as retention, endurance and
application, each implying different levels of competent activity, expands our sensitivity to this challenging topic.

We now know that relatively low frequencies support retention of high degrees of accuracy. For example, when we studied the effect of a summer of disuse on the quality of arithmetic performance, we found that computational accuracy stayed high independent of performance frequency. We had anticipated that there would be a differential effect with higher performance losing less than lower performance, but this was not substantiated over July and August, 1976 (Haughton, 1976).

Some of the best published data relating to required performance quantity comes from a landmark article by Wood, Burke, Kunzelmann and Koenig (1978). This article delineates quantity requirements for the application of performance in forty topics in fundamental mathematics skills. In this article they also document performance quantities related to failure in math programs at the grade eight level. One aspect evident in this study is that the ratio between disabled and unsuccessful students is similar to that of the relationship between unsuccessful students and the community median. Now we have a dramatic focus on the consequences to students when an educational system fails to set relevant quantity expectations for its clients. To select only one example, the relationship of a basic addition performance is that disabled students are divide by 1.6, while unsuccessful to community is divide by 1.5, creating a gap of divide by 2.5 between disabled and community users of regular mathematics.

We easily understand why those labelled as disabled cannot expect to meet regular performance requirements when their deficiency is, in part, caused by lack of appropriate reference criteria to guide their teachers and their didactic sequences. A quote from a statement of Instructional theory illustrates that this lack of criteria begins at an early age:

The term "kindergarten" should be retained, since it describes the function of this introductory period and serves to resist pressure to apply the rigors of schooling too early to young children. (Hall-Dennis Report, 1968).

The importance of practising at different frequencies is often overlooked. Practice can occur below, at, or above competent or fluent performance levels. This deficiency in our planning is easily understood as a side effect of our lack of performance referencing criteria with which to assess or evaluate the adequacy of student activity.

Perhaps the area that is most seriously omitted is that some practice needs to occur at higher frequencies than the desired performance. For example, oral reading reaches competent levels in the 400 to 250 words correct per minute range. North American averages in the first three grades are in the 50 to 70 words per minute range. It is extremely difficult for a student to reach 250 words per minute when he receives direct experience at these low levels along with new selections to read daily. Therefore, we use poetry or short passages of ten to twenty words at first to ensure that the student will achieve over 300 words per minute during the first few weeks of his oral reading experiences. Not only does this experience improve the development of oral reading, it also establishes crucial prerequisite acts necessary for silent reading. Extended exposure to oral selections at
inadequate levels in the 50 to 70 words per minute range fails to prepare a student adequately for either effective oral or silent reading. Furthermore, the student is actually practising the wrong behaviour when not reading orally at or about 250 words per minute or silent reading over 600 words per minute.

Teachers or other people trying to establish effective reading skills cannot be blamed for failing to program students to criteria levels when these aren't specified for teacher guidance and decision-making. An authority on reading, Dr. Elizabeth Thorn, suggests four criterion types of silent reading in her book, Strategies for Effective Reading (Thorn & Fagan, 1975). These are: scanning (very fast), skimming (fast), recreation (fast and slow), and study (slow). These descriptions are valuable, yet the author's failure to offer quantitative values as criteria leaves teachers and students groping for reasonable and effective levels. I suggest certain levels as guidelines in these areas: scanning 20,000 words per minute; skimming 5,000 words per minute; recreation 2,000 to 1,000 words per minute; and study 1,200 to 600 words per minute. Each of these estimated levels of word consumption needs to be paired with an excellent level of comprehension. Comprehension can be checked by the appropriate use of either oral or written answers, each performed at an appropriate level. Some competent level of reading words is crucial to both teachers' and learners' functioning.

To summarize, we need to become aware of and to set competency achievement goals, as well as to specify effective practice ranges ensuring proficiency development.

One way to offer experiences at high levels is to encourage the learner to recite (Think/Say) sequential materials, such as counting or the alphabet. Performance in the 600 to 400 per minute range develops both attention and muscle facility. Although my examples have come largely from reading, similar examples exist in typing, math, writing or musical performance. Following the suggestion by Bob Balabuck about high frequency exercises, Richard McManus practices his saxophone scales at around 1,000 notes per minute (McManus, 1980). Bob Balabuck is a semi-professional banjo player in Thunder Bay, Ontario, who uses practice ranges in the 2,000 to 3,000 notes per minute to establish competent levels of performance (Balabuck, 1977). Bob uses high-paced practice to strengthen the performance of his young student proteges, who perform well during musical competitions.

Occasionally you also want to practice well below the competent range. This you do, especially when refining the quality of performance or to master a particularly difficult set of movements. The idea of a performance guideline for effective practice evolved after observing many young people struggling to practice at low frequencies. Our best estimate of an independent practice range, at the present time, is to take the low part of a fluency estimate and divide by 2. For example, oral reading becomes competent at about 250 words correct per minute. Therefore, an estimate of the level necessary for independent practice is about 125 words per minute. Independent practice levels are important, since at these levels learners can evaluate their own performance while quickly reaching competent levels. The guideline of "divide by 2" is only a rough approximation, so individual factors need to be taken into account, resulting in higher or lower reference points for an individual's independent practice range.
Figure 1. College students who read their texts more rapidly also write more details during comprehension checks. In this case neither the silent reading (See/thought) nor the comprehension check (Think/write) is at competent levels, minimum estimated at 600 words per minute and 40 details per minute, respectively.
Chart 1. A sample of 10 pinpoints from the 271 Pinpoint booklet (Haughton, 1977). Note that young people perform at or about adult levels correctly on these topics. (These data are from snapshots, therefore, are quite low estimates of achievable levels with practice.)

THUNDER BAY R. and S. Brown E. and E. Haughton

SUMMARY
* READING
Dr. Eric C. Haughton
LOYALIST TEACHING MASTER

PERFORMANCE MATRIX
ACADEMIC PERSONAL SOCIAL

E.C.E. LOYALIST COLLEGE

80/10/15
Y.M.D

Topic __Orff Music__

<table>
<thead>
<tr>
<th>THINK (T)</th>
<th>TOUCH (To)</th>
<th>TASTE (Ta)</th>
<th>SNIFF (Sn)</th>
<th>SEE (Se)</th>
<th>HEAR (H)</th>
<th>FEEL (F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Representational ideas</td>
<td>Representational ideas</td>
<td>Representational ideas</td>
<td>Representational ideas</td>
<td>Representational ideas</td>
<td>Representational ideas</td>
<td>Representational ideas</td>
</tr>
<tr>
<td>Sing, speak, exercises</td>
<td>Preferred touch, contact</td>
<td>Preferred touch, contact</td>
<td>Preferred touch, contact</td>
<td>Preferred touch, contact</td>
<td>Preferred touch, contact</td>
<td>Preferred touch, contact</td>
</tr>
<tr>
<td>Beat, rhythm, imagine</td>
<td>Beat, rhythm, imagine</td>
<td>Beat, rhythm, imagine</td>
<td>Beat, rhythm, imagine</td>
<td>Beat, rhythm, imagine</td>
<td>Beat, rhythm, imagine</td>
<td>Beat, rhythm, imagine</td>
</tr>
<tr>
<td>Beat, rhythm, imagine</td>
<td>Beat, rhythm, imagine</td>
<td>Beat, rhythm, imagine</td>
<td>Beat, rhythm, imagine</td>
<td>Beat, rhythm, imagine</td>
<td>Beat, rhythm, imagine</td>
<td>Beat, rhythm, imagine</td>
</tr>
</tbody>
</table>

**Figure 2.** An example of a matrix describing portions of an Orff Music Program

<table>
<thead>
<tr>
<th>AIM (A)</th>
<th>DO (DO)</th>
<th>DRAW (D)</th>
<th>EMOTE (E)</th>
<th>MARK (Mk)</th>
<th>MATCH (M)</th>
<th>SAY (S)</th>
<th>SELECT (St)</th>
<th>TAP (Tp)</th>
<th>THOUGHT (Tt)</th>
<th>WRITE (W)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

R. Michel Eric Haughton Katherine Smithram
Supervisor Advisor Manager

ECC I-II students
Behavior Age Label

Reg Students
**Figure 3.** Matrix describing the teaching theme - transportation

<table>
<thead>
<tr>
<th>THINK (T)</th>
<th>TOUCH (To)</th>
<th>TASTE (Ta)</th>
<th>SNIFF (Sn)</th>
<th>SEE (Se)</th>
<th>HEAR (H)</th>
<th>FEEL (F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Different types of transport</td>
<td>Toy vehicles</td>
<td>Meals and on planes</td>
<td>Fumes from gasoline</td>
<td>Vehicle and roadway safety rules</td>
<td>Conserving or consuming</td>
<td>Occupations or sites</td>
</tr>
<tr>
<td>Different types of transport</td>
<td>Vehicle, post</td>
<td>Meals and on planes</td>
<td>Fumes from gasoline</td>
<td>Safety and transport</td>
<td>Occupations or sites</td>
<td>Safety rules and consuming</td>
</tr>
<tr>
<td>Safety rules and consuming</td>
<td>Safety rules and consuming</td>
<td>Safety rules and consuming</td>
<td>Safety rules and consuming</td>
<td>Safety rules and consuming</td>
<td>Safety rules and consuming</td>
<td>Safety rules and consuming</td>
</tr>
</tbody>
</table>

**Dr. Eric C. Haughton**
**Loyalist Teaching Master**

**E.C.E. Loyalist College**

---

**Liz Vandercole, E.C.E. Haughton**
**Supervisor, Advisor, Manager**

**ECE I+II**

**Preschool Students 3-5 Years Preschool**
Figure 4. This matrix describes the teaching theme - vegetables.
required, especially in the Think/ and Feel/ rows, making 18 channel sets of the possible total of 63. Using this matrix descriptively, you will be surprised at how few channel sets we generally employ in our programming.

This lack of comprehensive use of, and instruction in, appropriate amounts of channel sets can be illustrated by referring back to the math comparison data. The examples I selected were all See/Write, as were all of the 40 topics checked. Thus, descriptively, this study explored 40 different math topics, all in the See/Write channel set, or 77/1, where 77 is the total possible and 1 is the number of channel sets measured, recorded, compared and analysed. In another instance, I summarized our efforts with a young exceptional student, and surprised myself by "discovering" that of approximately 80 charted projects, we indulged in mainly four channel sets: See/Say, See/Write, Think/Say and Think/Write. We gave no specialized attention to the Feel/ row and only quite mechanical coverage to Think/ row.

Since mobility is a crucial topic, we'll touch briefly on this matrix. The rows are the familiar Feel, Hear, See, Sniff, Taste, Touch, and Think, while the columns are Roll, Creep, Crawl, Scoot, Cruise, Walk, Run, Gallop, Hop, Jump, Leap, Slip, and Slide:

<table>
<thead>
<tr>
<th>T/</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>I/</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>To/</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ta/</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sn/</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sa/</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H/</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E/</td>
<td>Roll/Crawl/Scoot/Cruise/Walk/Run/Gallop/Hop/Jump/Leap/Slip/Slide</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This gives us a matrix of 91 channel sets, not all of which have the same significance or programming importance, but which can be important as well as useful during instructional programs designed to develop basic mobility and walking.

4. Durations and Intervals - Sprints

In the late 1960's when we began our serious attempt to record both count and time, to explore such data's efficiency and usefulness, we tended to record performance to its completion, the end of a sheet or other arbitrary assignment length. This caused computational difficulties in determining the rates, and also set rather lengthy performance intervals for students. Harold Kunzelmann and I began exploring stable one and two minute intervals as a starting base for students, teachers and our information base. Since students seemed more comfortable and data were much easier to compute (many people find simple division difficult), we shifted much of our attention to relatively short intervals.

One minute is not a short interval if you are unskilled! I remember dropping to a .5 minute interval instead of the whole minute with a low performing student in Eugene, Oregon, to see if this interval would accelerate performance development. The student's half minute rate doubled...
the full minute's performance. This meant that the student emitted his full performance in the first half minute, fatiguing or burning out in the last 30 seconds. During skill building we've found that short intervals are related to higher performance levels while also reducing the amount of duration-induced factors (attention and motivation, less fatigue, for example). We now set up "sprint" practices where a series of short intervals gives the learner the experience of high quantity in brief periods.

You could check various intervals in the same way you would check stimuli, consequences, channels or intervals, by snapshots or 10-day Classroom Learning Screening, a process developed by Og Lindsley and carried on by International Management Systems (Kunzelmann & Koenig, 1979). Determining the learner's maximum interval that ensures learning is a cornerstone in an effective program.

Compounding

Combinations of skill-building factors will help people to develop high performance levels in brief developmental periods. Perhaps it is self-evident that effective practice conditions may combine several practice considerations. Common combinations are the sprint interval, strong channels, related to aims based on our best estimate of proficient performance.

One of the most effective applications of these contemporary quantity and quality considerations occurs in locating and establishing prerequisite skill performances. It seems cruelly ironic that our failure to specify frequency-based performance criteria causes student failure to reach necessary levels. Not only is there a lack of criteria, but teachers are even encouraged not to quantify information about performance. Quoting again from the Hall-Dennis Report (1968), elementary school teachers are instructed:

The teacher will be concerned with qualitative aspects of achievement - 'Does Jan like to read?' 'Can Susan describe her house?' rather than with quantitative measurement. (emphasis added - EH)

In Ontario, Canada, one consequence of such philosophy shifted teachers from poor achievement testing to no quantitative analysis at all.

Although there are many possible examples, perhaps relating to basic math skills will suffice. By about 1971 we realized that basic math facts in addition, subtraction, multiplication and division is needed at 120 to 80 correct per minute in the See/Write channel, whereas performance actually checked out at 25 to 30 problems correct per minute. Many students and teachers reported difficulties in reaching these new levels. We quickly realized that performance on See/Write sums to 18 rested on a set of prerequisites, that all had to be, or close to, competent/proficient levels to synthesize constructively into the See/Write +18 assignment. We checked some correlations, finding high, statistically significant relationships between the target task (eg. See/Write +18) and prerequisites such as Think/Write digits 0–9 (Haughton, 1972). I recently checked the performance of Loyalist College students on See/Write mixed math facts correlated to Think/Write 0–9. The middle correct on computations falls at
### Chart 2.

A sample page from the Body Control Guidelines booklet (Kovacs and Haughton, 1978). The performance levels indicated by a range bar were collected by Mary Kovacs and her staff. While these ranges have proved to be lower than competent levels, they formed the basis of our early decision-making with severely disabled students.

<table>
<thead>
<tr>
<th>Movement</th>
<th>Count Per Minute</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guide/roll (in prone, rolls over to supine and then to prone along path)</td>
<td>1</td>
</tr>
<tr>
<td>Touch/think/roll</td>
<td>1</td>
</tr>
<tr>
<td>Hear/think/roll</td>
<td>1</td>
</tr>
<tr>
<td>Think/roll</td>
<td>1</td>
</tr>
<tr>
<td>Guide/rock back (sits cross-legged, hands in lap, moves trunk backward and forward)</td>
<td>1</td>
</tr>
<tr>
<td>Touch/think/rock back</td>
<td>1</td>
</tr>
<tr>
<td>See/think/rock back</td>
<td>1</td>
</tr>
<tr>
<td>Hear/think/rock back</td>
<td>1</td>
</tr>
<tr>
<td>Think/rock back</td>
<td>1</td>
</tr>
<tr>
<td>Guide/rock side to side</td>
<td>1</td>
</tr>
</tbody>
</table>

October, 1980.

Activity: Journal of Exception Teaching, Volume I, Number 3.

Figure 5. College students perform writing digits 0-9 (Think/write) at too low a level to correctly signify their skills in basic math computations on a sheet with mixed +, -, x, (See/write). The correlation of .56 reinforces the point that more adequate Think/write 0-9 (at 250-150 legible digits/minute) would facilitate these students' math capabilities.
45 per minute, while sequential number writing is at 130 per minute.

We are no longer surprised to find that educational settings that are unaware of quantity criteria fail to produce appropriate levels in such crucial topics as: Think/Say counting forwards and backwards, See/Say reading numerals, sequenced and mixed order, Think/Write numbers, See/Say operational signs, Think/Say from a number to a number along with adequate coverage of Think/Say or /Write and Feel/Say or Write my personal reasons for becoming skilled in math. I won't go into specifying criteria levels for these topics, but you will not be surprised to find extremely low and non-applicable performance levels in these topics, since no effort had been made toward establishing high, proficient levels of performance.

Our lack of specific performance aims, goals or standards is creating a continental crisis in education. It is also partly due to this lack that we fail to practice adequately. When performers know what criteria they are up against, as in track or swimming, they generate extremely high practice ratios to ensure adequate performance levels.

While many professionals have ignored the importance of goals or aims, I will never forget the insightful reaction of a second grader. While exploring the importance of aims, I asked the class why we needed goals or aims. One second grader popped up with, "Well, if you don't have aims, then you'd be AIMLESS!" While we haven't exactly been aimless, desiring as we do to produce performance improvement, our lack of precise aims has led to conducting inadequate practicing practices. Out of the mouths of babes....

Combining the will of our students to improve with our excellent stimulus and consequence management, while augmented by our growing information about proficiency levels and practice conditions, we will greatly increase our students' performance and problem-solving capacities. Thoroughly developing our students' skills will greatly enhance their capacity to cope with problem resolution and decision-making challenges they will face in the future.

REFERENCES


-> Duval, B. A modern day fable: Prince Og and Princess Log. Exceptional Teacher, 1980, April, 5-6.


Dr. Eric Christian Haughton is the Coordinator of Early Childhood Education, Loyalist College, Belleville, Ontario.