

during the final phase of CVC real and nonsense trigrams. Frequency multipliers were also used to measure the gain from the median of the first three timings to the median of the last three timings during the final phase of CVC real and nonsense words. In both measures, the most growth occurred in the medium frequency experimental group and the least amount of growth occurred in the high frequency experimental group (see Chart 1).

These data suggest a relationship between the frequency of saying letter sounds and progress on saying CVC real and nonsense trigrams. In this study, it appears that the optimum rate of saying letter sounds in relationship to subsequent progress in saying CVC trigrams is 90 sounds per minute.

STUDY II

A second study was completed with a class of first grade students. Each student was administered three one-minute timings on writing answers to addition facts (+1's with sums to 10). The students were assigned to a high, medium, or low group depending on the frequency of answering addition facts. Students were then administered nine one-minute timings on writing answers to addition facts (+2's with sums to 10). Frequency multipliers were determined based on the median of the first three timings and the median of the last three timings on +2 addition facts. Information was also summarized concerning the average number of math skills mastered by each group in the school math program (see Table 1).

Although optimum aims were not established in this second study, it was clearly demonstrated that the proficiency level a child attains on writing answers to addition facts makes a significant difference in progress on subsequent related math skills.

CONCLUSION

The proficiency levels that children attain on specific skills do make a critical difference in progress on related skills. A relationship between rate of saying letter sounds and progress on saying CVC real and nonsense trigrams was demonstrated in

this research. A relationship between rate of writing answers to math facts and progress on related math skills was also demonstrated.

The conclusions from these studies suggest that there is a need for further investigation of the specific role that frequency plays in subsequent learning. A major focus of this research should concern the identification of proficiency frequencies in a variety of skills and subject areas. By empirically identifying these frequencies, instructional goals can be established that ensure competency and efficiency in education.

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AIM*STAR WARS

[Setting Aims that Compete]

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Episode V: Uneasy Truce

In previous episodes we met a host of Learner Rebels and Learner Knights as they struggled to overthrow the bonds of the Evil Normie Empire. Now we turn to the final

pages of Uncle Owen's chronicle as he reviews what has been revealed to him of the mysterious Learner Force. It seems that our dreams of defeating forever the Evil Normie Empire must await another age. For the moment, it seems that we must content ourselves with certain gains and an uneasy truce...

Eventually, instruction in the formal sense must stop. Special, artificial support for the skill will no longer be available. That does not mean that **learning** must stop, but the learner must be able to function independently, or the skill will simply cease to exist in any meaningful sense of the word.

I have already explored the notion of using traditional peer standards as performance aims and found them wanting(see Episode I, "The Deathstar"). While it is true that achieving normal levels of performance may facilitate acceptance into peer groups and provide useful skills for at least some post-school environments, it seems more often the case that other forms of competition will determine the eventual usefulness of the skills we teach.

In some cases, the skills which we would have our Learner Rebels master are in direct competition with other skills already in the Learner's behavioral repertoire(see Episode II, "Return of the Learner"). If we are to prevent the Learner from slipping back into those old habits once instruction is terminated, we must make it much easier for the Learner to use the new skill than the old. That might best be accomplished by setting the fluency aims for the new skill $x1.5$ to $x2.0$ higher than the fluency with which the learner is able to use the old, less desirable skill.

"Managers" in the Learner's world might also represent a form of competition(see Episode III, "The Normie Empire Strikes Back"). If the learner lacks fluency, others may simply become impatient and complete the task themselves or otherwise prevent the Learner from attempting the skill. Generally, managers can only be expected to allow a learner to perform a skill if it is [A]ge appropriate or

otherwise expected, takes [L]ittle of the manager's time, [L]essens the manager's workload, does not compete with [O]ther demands on the manager's time, or is for some reason of special [W]orth to the manager. If demonstration of the skill depends in some way on manager cooperation, then performance standards for the new skill must take managerial patience and demands into consideration.

If a skill has been brought to a level where it competes effectively with any necessary peer standards, other behaviors in the learner's repertoire, and managerial patience and demands, then one might reasonably expect the skill to be used if and when it is appropriate to do so. However, the anticipated frequency of use should also be considered when establishing fluency standards.

If the skill is not likely to be used often, high fluency aims should be established before formal instruction is terminated(see Episode I, "The Deathstar"). If the skill will be used often, then relatively low aims may suffice. Even if those aims represent a fluency lower than one would eventually like to achieve with the skill, frequent use is likely to provide the practice necessary to build that additional fluency.

Will the Learner really continue to develop fluency without our guidance? Given a chance and a reason, Christina did just that(see Chart 10).

Carolyn Kaiser wanted to practice her Precision Teaching and was offered the chance to work with Christina, a cute, cooperative four year old Down Syndrome Learner-Rebel. Now, Christina's teachers were already having good success with all of her IEP objectives and did not particularly want to take a risk that Carolyn might mess things up. On the other hand, they didn't want to take Christina's valuable time to work on some totally irrelevant skill, so they compromised by selecting a skill that should have been a good year in advance of Christina's "developmental age" -- naming three basic colors. If Christina made progress, fine. If not, well, that was to be expected.



DAILY BEHAVIOR CHART (DCM-9EN)
6 CYCLE - 140 DAYS (20 WKS)
BEHAVIOR RESEARCH CO
BOX 3351 - KANSAS CITY, KANS 66103

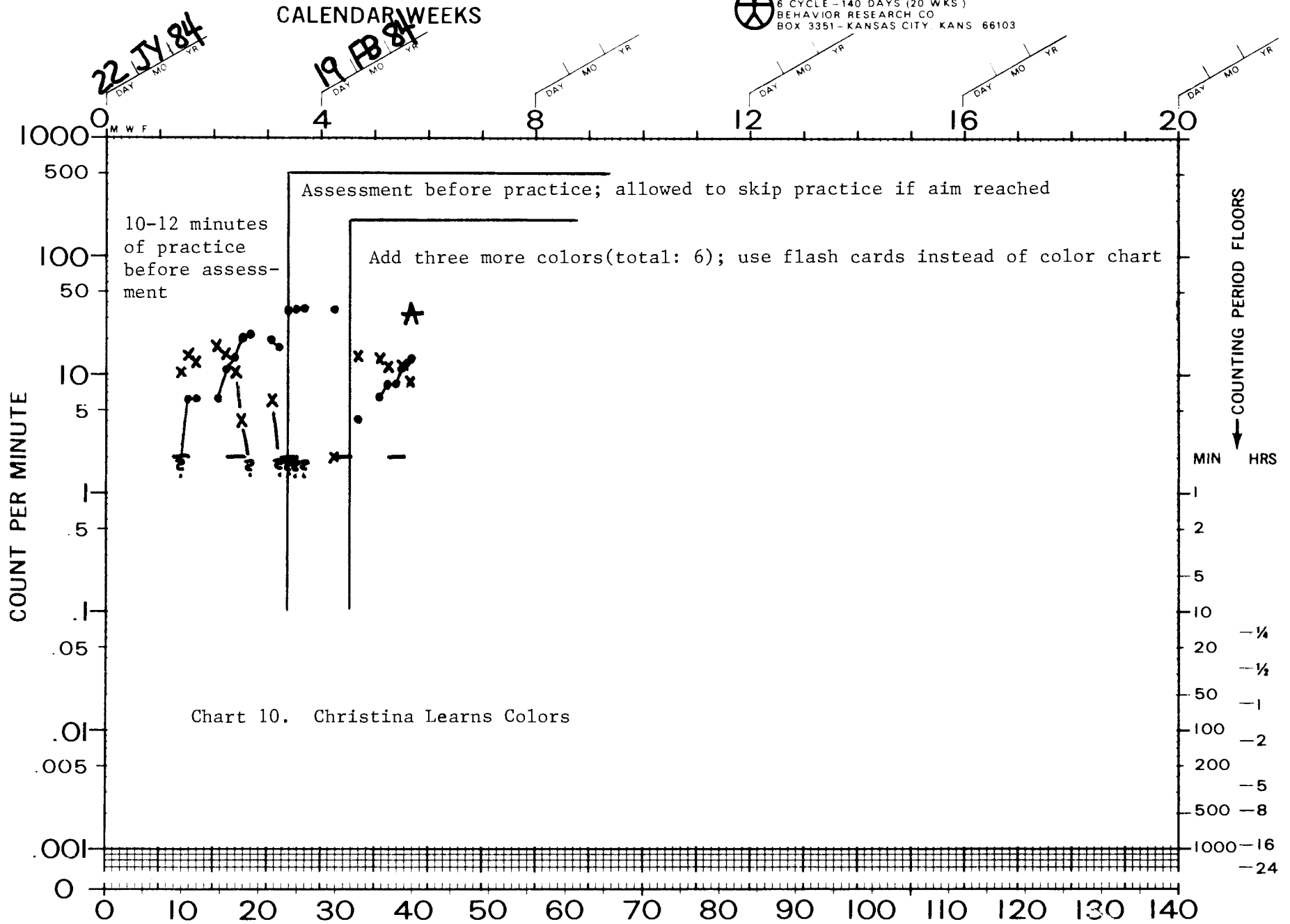


Chart 10. Christina Learns Colors

SUPERVISOR			White		Kaiser		Christina		4		points to colors named	
ADVISER			MANAGER		BEHAVIOR		AGE		COUNTED			
University of Washington						Seattle, Washington		COUNTER		CHARTER		
AGENCY												

Carolyn liked challenges, so everything was fine.

Following 10-12 minutes of instruction, Christina was assessed for 30 seconds and failed to name a single color-circle correctly. Oh well, it is a year early.

Carolyn still liked challenges. She hoped Christina felt the same way.

The next day, following 10-12 minutes of instruction, Christina achieved a correct frequency of 6 per minute over a 30 second timing, with a higher error frequency.

After seven days and a jaws-crossover, Christina seemed to peak out at 20 corrects per minute with 4 or 5 errors per minute, the edge of fluency-building, according to some rules (White and Haring, 1982). This is a good performance, but still too slow to be sure that Christina will remember the names very long, especially considering the anticipated frequency of skill use. This is too soon to let Christina go her own way. The "rules" would suggest a change in consequences to make continued practice worthwhile.

Learner-Rebels don't always read the professional literature. They might not know about the rules.

Carolyn decided to chance it. She would place faith in the Learner-Force and let Christina go. For a little insurance, however, she also arranged things to make continued (independent) practice worthwhile. She moved the assessment to the BEGINNING of the session (it used to be at the end, after 10-12 minutes of instruction) and told Christina that if she practiced on her own and met aim, there wouldn't be any instruction. "Aim" was 40 per minute-- x2 Christina's best performance to date. On the first day following the change in plan Christina reached 38 per minute with no errors. The same performance was recorded on the second day. On the third day she reached aim without "instruction." Carolyn responded appropriately by moving quickly on to the next level in the curriculum (more colors) -- a level supposedly a year and a half above Christina's "developmental age."

Can kids learn on their own?

They can, if they have a reason.

The best reasons are provided by working with a skill that will be immediately useful to the learner in daily life. Even if you find it necessary to work with somewhat more "abstract" skills, learners can still learn on their own if the consequences for doing so are meaningful. For Christina, those consequences were the repeated opportunities to buy her way out of 10-12 minutes of instruction.

One should never place blind faith in learner progress, however. Scouts should be employed to assess skill use outside instruction; Flankers should be deployed to assess the development of important related skills not being directly taught, and Rear Guard assessments should be conducted to make sure skills for which direct instruction has been terminated are being maintained and, if necessary, are continuing to develop in fluency (see Episode IV, "Scouts, Flankers and Rear Guard").

If you have reached your performance aim for CVC words in isolation, but climb the ALPs (Advanced-Learning-Probes) only to find the learner is still making mistakes with CVC words within the context of the grade-level reader, then the learner is still not using the skill you tried to teach. Raise your aims. Provide the learner with the fluency which will make the skill easier to use and more functional.

Don't just discontinue instruction in dressing skills when the learner meets the standards you agreed upon with the parents. Call the parents. Is the learner dressing himself in the home? If not, raise the standards to compete more effectively with whatever is holding the learner back.

If the skill is one which the pupil should use every day, find out if it IS being used when the learner is not specifically directed to do so. Does the reader CHOOSE to read? During freetime, how often does the learner read instead of playing pool? At home, does the learner ask what's on TV or simply read the TV guide? Does the learner buy or subscribe to any

magazine that isn't all pictures? Does the Learner READ? If not, it may simply be a matter of "taste"(playing pool can be nice too), but it may also be a matter of dysfluency. Try raising the aims.

Once a learner reaches aim in "takes bite with a spoon," what happens when you walk away? If fingers come into play with food more appropriately eaten with a spoon, then the aim for spoon-use was too low.

Take away the constraints. Don't tell the learner what to do. If the behavior you tried to teach is still used, then the performance aim was adequate to provide a service for the learner, at least for the time being. You will have at least reached that level of "independent practice" which Young Eric described(Haughton, 1980), and you might serve the learner's needs better by moving on to another skill.

Indeed, one might be well advised to conduct USE(Undirected Skill Employment) probes throughout a program. Set a few seconds aside each day to see whether the learner chooses to use a skill even when not specifically directed to do so. When unprompted use begins, perhaps it is time to move on. Success on USE probes becomes the aim. Of course, a few rear guard and flanker probes from time to time might also be wise...just to make sure.

So what's the bottom line?

Place faith in the Learner Force whenever possible.

However, don't abdicate all responsibility for setting at least minimal performance standards which will allow the learner to..

- [A]advance rapidly to a level where the skill can be demonstrated
- [I]independently,
- [M]maintained over time, and provide a
- [S]service of value to the learner.

Generally, for performance standards to become AIMS, they must provide..

- [C]onfidence that the new skill will compete with

- [O]ther skills in the learner's own behavioral repertoire,
- [M]anager expectations and patience, and, when appropriate,
- [P]eer performances. Generally, to enable the learner to be
- [E]ffective in achieving those ends, we should
- [T]arget the highest level of
- [E]fficiency possible.

In other words, our AIMS must COMPETE.

Aim HIGH!

However, don't assume that you have to do all the work.

Whenever possible, allow the learner to provide for his or her own practice and to develop necessary additional fluency independently. Keep up the rear guard, flanking and USE probes, though, just to make sure it really happens.

Am I getting closer, Eric? Will I ever truly understand the mysteries of the Learner-Force?

Postscript

Through this tongue-in-cheek adventure I have attempted to share some of my own opinions concerning performance standards. I find that over the years my opinions are becoming increasingly similar to those who have preceded me in the quest for the ever elusive Learner-Force, including of course, Eric Haughton(Young Eric, Learner Knight, the man in search of the seventh cycle) and Ogden Lindsley (Ogi-Wan Sixcycle, the original Learner Knight). To them and so many others I owe a great debt. Perhaps someday I will finally catch up. Still, I might have misrepresented some of their opinions in this series, due in part to my own misunderstandings and the sad lack of "hard data" concerning the issue of performance aims.

I suppose, if I have an overriding opinion on the matter, it would be simply that there are no sure answers, no truly functional aims set in stone, unchanging for time immemorial. Rather, I believe that the frequencies which will make performance aims functional will rise and fall with the tide of curriculum development, the

changing demands of the world in which all Learner Rebels must live, and our own talents and priorities as teacher/managers. We must continue forever the evaluation and evolution of our standards.

Most importantly, though, I firmly believe that what will prove functional for one learner might prove dysfunctional for another. We could simply set aims so high that they would ensure functional fluency for virtually any learner, but that might prove counter-productive to rapid movement through curricula. I believe that we must look to the learner's own behavioral repertoire, the learner's own managers' patience and expectations, and at least occasionally, the learner's own peer group for guidance. We must document the functionality of an individual's aims by probing outside the instructional situation and after instruction has been terminated to determine if the skill we sought to develop is actually being used. That, unfortunately, is where our data fail us most.

Although I have tried to share interesting and suggestive charts throughout this series, the reader will note that most of the charts showed the performances of learners only within instructional situations. I have provided no data to verify that the frequencies of competing behaviors did indeed play a role in determining the functionality of new skills. The documentation that an assessment of managerial patience can lead to a functional performance aim is non-existent, at least within the confines of this series.

I, and Learner Knights Haring, Liberty and Billingsley, are currently conducting additional studies concerning those issues, and will share our charts as they take form. Meanwhile, if any reader has already collected information that bears on the notions presented in this series, or would like to communicate concerning possible future studies, we would be **very** interested in hearing from them.

May the Learner Force be with us all.

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Chart-sharing

PRECISION RUNNING: A REAL SHORTCUT!

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A significant consequence of daily charting is discovery (Lindsley, 1970). The purpose of this article is to share how daily charting led to an important discovery for me in running.

When I began running on March 1, 1975, my daily schedule reflected the tempo of the time: Long Slow Distance-- LSD --(Henderson, 1984). Basically, this suggests running longer distances at a slower speed with regular doses of speedwork. LSD was contrary to track running in the U.S., which until 1969 was running shorter distances at race pace (that is, SFD).

I departed from the LSD practice in 1980 when I began running much longer distances at a much faster pace. I continued this schedule until September, 1982 when I began having soreness on the bottom of my right heel. I decreased my speed and mileage to relieve the soreness, but it persisted. In December, 1982, I consulted a