

Wrap-Up Address at the 1989 Precision Teaching Conference

Ogden R. Lindsley

University of Kansas

Precision teaching has always been by teachers for children's use. And one of our slogans has always been the "Child knows best." And I have some real ancient transparencies, which we used to have on that, and I don't know if I have a "child knows best one." And "the child knows best" is a translation from one of the most important things that I've learned from Dr. Skinner. Which was, I learned "Frequency: Frequency is a universal datum." Those were Skinner's words. Translated to English, that means everything's got a frequency, and the most important thing to look at is its frequency. Don't watch how big it is, watch how often it happens; its oftenness. And I went to Skinner one time, and I was very a kind of aggressive young graduate student. I had a chart of a rat that was doing differently than the book he had published on what rats should do, in The Behavior of Organisms. And I said, "Fred, what do you think about this extinction curve? The rate went up before it went down." He looked at it and he said, "Well, that's very interesting, Og. We should publish that in someplace." And I said, "Well, what about the book?" He said, "Well, the book's wrong. The rat knows best. He's the rat. That's why we still have him in the experiment." Now if we knew more than rats we wouldn't do experiments with them. We'd tell them what to do and write about it.

That's the way to stay inductive. You get the ideas from the classroom--the place the new ideas in precision teaching comes from is in

the learning of the children. It's not in university thinking. It's not in supervision thinking. This is an early "child knows best" transparency. This one comes from the Florida Precision Teaching program, that Hank Pennypacker set up. That the "child knows best" is one of our basic principles.

Learning Pictures

Now the application of this in Pat Alt's classroom--seventh grade, words spelled, May 1977. Here's Jim's learning picture. Number correct and number wrong. Here's Karla, number correct accelerating about a times 1.5 or 1.6, errors below the floor. Here's Amy, number correct and number wrong sort of in the middle. Here's Leon, number correct accelerating and number wrong accelerating. The children named these pictures. They named Jim's picture "jaws." They named Karla's picture "climb"--thinking of an airplane at altitude climbing, and the red errors is the land. They named Amy "mid-level." And they made Leon "uphill."

They make--you can think of 9. Academically you can think of 9 learning pictures--combinations of accelerate, maintain, and decelerate. And the errors, accelerate, maintain, and decelerate. The kids named 11, because there were more than one important kind of parallel. In fact, Seattle called this "railroad tracks" at one time. But that's a university idea, I think. The kids saw this one--I don't know if I have the other line with me. They saw that picture very different from a picture. I'll draw you the three other pictures. There was this picture, and I think her name was Amy. Those were below the floor. She was often asleep on the desk, and they later found out that she'd been taking pills. Then another learning

picture was--this is the "aim"--was correct at aim and errors at aim. So what we academically had anticipated, both X1 accelerations, the children saw it as midlevel, rockbottom, and aim. That's the child's ideas of this thing. Our newest ideas I think in Precision Teaching are going to come from the children, as they always have, through the teacher's hand, by the teacher, for the children, from the children

Now, what have we done that wasn't going on? In 1924 Ogden was in school. And he was in Second Grade. Ogden skipped First Grade because his mother taught him at home with a first grade book. So Ogden graduated from High School at 15 to 16, and wanted to play football but couldn't. Every time I went out for football practice you'd hear bones rattle when they hit me. But I learned I could run fast, so I ran a 4.28 mile in high school then. But the track letter was smaller than the football letter. That was the absolute truth. Okay. In second grade I had a book called A Child's Book of Numbers. A Child's Book of Numbers: Isn't that interesting? Counting: "One little, two little, three little Indians, four little, five little, six little Indians, seven little, eight little, nine little Indians, ten little Indian boys." You can't sing that anymore. You go: "One little, two little, three little people, four little, five little, six little people, seven little, eight little, nine little people, ten little people boys." Ten little persons? Ten little persons? Ten little humans. Ten little humans. Ten little E.T.'s. Ten little E.T.'s. Now the book had a review to see how many sums you could say in one minute. See how many sums you could give in one minute. One minute timing. How does this differ from Precision Teaching? If all you do is one minute timings, it's the same! "One little, two little, three little Indians, four little, five little, six

little Indians..."--A Child's Book of Numbers. The important thing is to count these, put them in a standard frequency, and look at the change in them over time. And the child should do that for himself.

What are the things we have learned about learning that were not known by Clara Atwood Fitz in 1924? And that's what I'd like to briefly summarize in the next couple of seconds.

This is probably what has the bad name. This is drill and practice. This is what's the kiss of death in education right now.

Acronyms

So I'll share with you some acronyms now. I have had trouble going around the road without my notes. People say, "What has Precision Teaching produced?" And I always can't remember. I say six things, and then in the car outside, "My god, I've forgot the most important." Now, if I can't remember them, how can you learn them? How can you remember? How can you--you grew up with them and can't remember. So, we have some acronyms to help with that. And the acronym is almost becoming a sentence. This stuff doesn't come easy. Ziggy Engelmann is an expert in doing this kind of thing. Of making rules and making little memory aids and things. The thing is:

PRACTICED MUSIC REAPS FUN.

Okay, everybody say that: "PRACTICED MUSIC REAPS FUN." Say it again: "PRACTICED MUSIC REAPS FUN." Say it again: "PRACTICED MUSIC REAPS FUN." Say it again: "PRACTICED MUSIC REAPS FUN." Say it again:

"PRACTICED MUSIC REAPS FUN." Say it again: "PRACTICED MUSIC REAPS FUN." Say it again. "PRACTICED MUSIC REAPS FUN." Say it again: "PRACTICED MUSIC REAPS FUN." Wonderful! Wonderful. Good.

PRACTICED

Okay, What's PRACTICED? PRACTICED is an acronym to sum what we've kind of found. We might have missed one here--but we've got most of them. The important things about PRACTICED are that they must be,

Particular--the practice must be close to what your final performance is going to be--very specific.

Rapid--It must be Rapid.

Added--It's obviously got to be Added to the other instruction. It's not an "in place of." It's used to enhance other instruction. It's added to something, which means it's absolutely necessary but by no means sufficient. You Add it. You Add it to your current way of teaching. You don't take anything out; you add this. You don't replace anything.

Counted--The practice must be Counted. Preferably by who? By the child.

Timed. It must be timed by who? Preferably the child.

Informed. The practice must be informed. The learner must be informed. Who? Who is it best to do the informing? Inform himself. You don't have

to wait for the teacher to come and find out how you did today.

Charted. It should be charted. Charted by who? The child.

Errorful. And it should be errorful.

Daily. Charted how often? Daily.

So that's our practiced. That's what PRACTICED means.

Now, if I go back to this, PRACTICED, what comes next? MUSIC. What comes next? REAPS. What? FUN. Yea!

MUSIC

So, MUSIC is a thing we have learned about behavior in general. This [PRACTICED] is kind of peculiar just to how in a stage of learning. But this doesn't do much across subject analysis of variance. This isn't a very general thing, this PRACTICED. It's very specific to practice. Now, anything you do--anything you want to practice follows this rule, no matter whether it's athletics, or music, or academics. It all follows this rule. Did you hear about the young couple who were lost in New York City? And they were trying to get to Carnegie Hall? And they saw a nice, little, old man, kind of hunched over with a violin case, with a white beard, kind of going along. And they said, "Sir. Sir, could you tell us how to get to Carnegie Hall?" He said, "Practice my son, practice." Anything works with practice.

MUSIC is for behavior in general. So when you think behavior, when you speak behavior, when you respect behavior you should think what? MUSIC.

And what's M? **Multiply**

What's U? **Unique.**

What's S? **Specific.**

What's I? **Independent.**

What's C? **Consequence.**

Multiply

So, Multiply means that frequencies grow by multiplying. They decay by multiplying. They bounce the same multiple up as down. And they're spread by equal multiples. If you have 30 kids in the classroom, or 300 kids in the school, and the middle kid is doing 30 per minute, and the top kid is doing 90 per minute, what's the bottom kid doing? 10 per minute. If the middle kid is doing 30 per minute, and the top kid is doing 60 per minute, what's the bottom kid doing? 15.

Unique

Unique--we should expect our procedures to be as unique as our clothing. We do not expect Tommy's shoes to fit Ruth. And we should not expect Tommy's curriculum to fit Ruth. The behavioral needs are at least as great--I say 2 times more, two to three times more uniqueness needed in behavioral environments than in our clothing.

Specific

Specific is really kind of related to this Particular thing, but it's more general. Like if you train speech--you're a speech pathologist--and you train a person who stutters, "Not To Stutter In Speech Path Sessions, But To Speak More Slowly And More Distinctly." And they go out in the parking lot, and someone bumps their car, they say "Wh-wh-wh-at th-th-the h-h-el-el do y-y-you th-th-think you're d-d-doing for ch-ch-christ s-s-sa-aa-ke to th-the car?" That's how specific behavior is. The best way a speech pathologist could teach people in a 20 minute session once a week to control stuttering 24 hours a day 7 days a week, is to teach them how to monitor their own stuttering, and put their own stuttering on self-control --self monitoring.

Independent

Independent means that as corrects go up, errors can go up, stay the same, or go down. As feelings go up, behavior can go up, stay the same, go down. As positive feelings go up, negative feelings can go up, stay the same, or go down. Everything we've looked at in behavior is independent.

Consequence

Consequence is what I got from uncle Fred Skinner, who may be probably one of your grandparents. So, he said the most important thing about behavior are its consequences. But we still haven't learned that. And the world thinks causes. So, whenever you have a behavior problem, and it starts, do not look at what started it, look at what follows it. The child is having a tantrum in a school, and goes "Wah anh wah an anh aaa aa

ah!!!” And the principal comes in and says “What’s going on here? What happened? What happened? What happened?” What’s the answer? “I don’t know. He hasn’t stopped yet.” The cause of the behavior is on the tail end. Behavior is pushed. It’s not pulled. It’s a rear engine thing. Great big engine on its butt. That’s behavior. You should learn that, and expect that.

REAPS FUN

And REAPS FUN. We’ll go rapidly through these. If you get fluency what do we have? Fluency REAPS FUN.

R is Retention.

E is Endurance.

A is Application. What does Application mean? You’re more apt to get generalization or what happens in other situations more often.

P is what? Performance Aims. Eric had P S being Performance Standards, which was kind of an awkward thing, and Carl and I discussed this many times. One of the most important things about fluency to Carl Binder selling of fluency in the industry, and he calls them fluency cards, is the fact that the behavior is resistant to distraction, which means it’s Stable. Eric knew this, he just hadn’t lived long enough to refine this. He was in thr process of doing it.

S Stable.

FUN. And then we all know in the classroom, if things are bored, and you walk in and do something, have them do a fluent timing. It's fun. They love it. You should start class with a what? Fluent timing. You should end class with a fluent timing. It's just like a marching band. Right. What's the first thing you do in rehearsal? [] You do something we know. In the middle someplace []

So it's very important to have the fun aspect of fluency.

Understanding. The U understanding is a little shaky here, but I think it's quite important. And that is, too many of us, when we do timings, introduce them with instruction, and it's a waste of time. Half of them may figure it out by themselves. And the ones that figure out by themselves--they teach each other. Which rewards knowledge. Which rewards research and self-instruction. And the few that are left, if you know the subject matter well enough to respond to the children's questions on call, rather than you having to read or leaf through the manual ahead of them or something, then they ask you a question and you can feed their answer. So to teach without understanding, and to only teach rules and understanding when the children or the learners request them, that produces what Festinger used to call 'cognitive dissonance', and you always know that you're not over teaching. You always know you're not teaching something you already know.

No cheating. And one of the best ones, the N, no cheating--and pretty close to no procrastination. It whittles down procrastination.

So those are the memory aids for the things that Precision Teaching has produced. Even though we went in only to help children learn, we ended

up discovering things about learning in general, and things about classroom learning and fluency in particular. So, what are the three words again? "PRACTICED MUSIC REAPS FUN" Yea class!! That's wonderful!

Charts Belong to the Children

Now I know some people have planes to get, and I want to do something that is a little traditional. And I always say having an example--the charts belong to the children, and if they do this kind of stuff too. These are real children charts. These are actually high school charts. And you can still see the trends of the data. I used to work with people who have really severe behavior handicaps, and this is one of my favorites. This is a copy of where a kid made big black dots, and ate a corner off the chart. The teacher replaced the chart with something that she'd be more comfortable sharing with a curriculum supervisor. They made nice, decent data points: You don't want to have a dot if you can't tell whether it's 12 or 14. Because the important thing is celeration. Now, in the two things, which one more carefully measured celeration? No difference. It's not frequency we're after, it's learning we're after. And the kid did not fill the blobs in, but when he continued on he made big blobs again. And what do you think else he did? He ate off the corner. Just like any territorial animal, mammalian behavior. That's his corner. Swss. And so we should welcome decorated charts rather than avoid them.

And I always close with a kind of a letter. This is a very famous letter. This letter actually brought Elizabeth Freeman into our family. This is a letter from Leola and Sherry, Whitaker School, Eugene, Oregon.

To Dr. Og Lindsley
Box 3351
Kansas City, Kansas

Dear Dr. Lindsley,

I like idea of the charts and they are fun to do. I have 19 chart. I chart every day. It is fun to do. The whole room has 19 charts. Miss Freeman has 7 charts. [That's pretty good for a teacher. This is November 6, 1970] Miss Freeman knows Dr. Hughton. Miss Freeman told me a little about you. I would like to meet you some day. I have heard a little about you. I am in Miss Freeman, Room 2. And I'm in second grade. So how do you like that? [[AUDIENCE LAUGHTER]. I know Dr. Haughton. He is nice. I'm sure you are. Miss Freeman is our trainer. Dr. Haughton is Miss Freeman trainer. Dr. Lindsley, are you Dr. Haughton trainer? [AUDIENCE LAUGH] "And then, Leola McConnell "and a little heart", 4.78 minutes, 425 letters correct 89 letter corrects per minute.

[AUDIENCE LAUGHTER]. So we have science—we have love and science united in a Second Grader, with 19 charts. That's where we were in 1970. And I urge you new family members to continue this tradition. It's beautiful. It's wonderful. You don't have to choose between science and humanity, science and love. You can combine the two. They combine beautifully.

Futures

I'd like to share some futures.

Try Three at Once

One is "Try Three." It can be done in all of your classrooms. You shouldn't do it just to do it, but you should do it when you need to have help in a hurry; when you've got a child in curricular crisis, or behavioral emergency. Don't waste three weeks, or like two weeks, two weeks, and two weeks. That would be six weeks. Don't waste a month and a half of his life to find a way to help you could find in two weeks, by trying all three things at once. So, we should try three channels. Channels are independent. If he knows size in see/write he does not know size in see/say. He may not. He may learn in see/say but not learn in see/write. I have these data, but for the time I will not bother showing you.

We could try three curricula at once. And we could try three changes at once. I've known this since Met State. At Met State we had really, really low level people, hydrocephalics. And I got to know them so well I called them "melonheads." Lying on beds. And one little guy--he looked like about 14 with an old-man head that was about four times too big; skinny little body on him. He had the first bed. And nurses would come from the nurses quarters by his bed and go work with the rest of the ward. Occasionally he'd vomit on his bed and down onto the floor. Make a mess and they'd have to change his sheets. I watched this, and funny. There was a very cute little red-headed nurse. In those days they had kind of short skirts; a little Irish girl, blue eyes, turned up nose, pretty freckles. She came in, and "bleahhhhh." "Oh Bobby! What happened? Oh, look at that! Did

you puke?! Ohhh!" She cleaned it all up, you know. She'd go back to the rest of the ward. He would puke three or four times during the three hours she was on. What about when old battleaxe Smith came in? If he was--if he did have phlebitis, he'd swallow it. He didn't want her changing his bed; her coming around. So, that's how specific behavior is in a hydrocephalic. So you can try three curricular changes at once; three reward or punishment procedures. You can try all at the same time. At different times a day; scramble the order.

Try Leap Ups

We should try leaps ups. We should try jumping up curricula to get times 2 celerations. I've forgotten the lady from Tennessee who has times 16 learning in high school kids. Who is it? Is she here? The Tennessee folks--are they gone? Times 16. That's like this on the chart. Flat charts are beautiful. Times 16 is--my God!! I can't believe it!! Did you see what I saw?!

I want to show you one example of a leap up because this cost this teacher her job. Her name is--it also cost the principal his job, but he had a couple of other things going on too--this was Marilyn Chapel, Garfield School, 1979, Gene Stromberg. This is number correct, number wrong, +5, +6, +5 and +6, and then she leaped up the curriculum into mixed addition, subtraction, multiplication and division without instruction. Just practice sheets. "You don't know what the multiply sign is? Well, try to figure it out, and we'll find out if it's right or not with an answer sheet." It divided the frequency correct by 60. In other words it was 60 times harder to do. But what happened to the learning? It multiplied by 4. Four times easier

to learn, 60 times harder to do. That's us. We don't expect it if you don't believe it, but that's us. Is it true with the other children? Children are unique you know, and you have to be really careful. But, here's Jody. Here's Holly, sweet little Holly. So, you see, they are capable of gigantic gains and gigantic curricular challenge, but we hold them back. We have a learning allotment. We dribble out the learning to them. So we have 1.15, 1.2. You have to be very careful. You might even set one with an aim, 1.25. You can trace all these children's learning, so you collect the celeration lines on one sheet. So you have a celeration collection. This is like a butterfly collection. Each and every unique person can be seen. There's no averaging here. This is a collection of celerations. There's the celerations correct, with a median $\times 1.9$. She was getting 1.6, 1.35, 1.33. She had moderate learning the other way. But look at the error learning. It went from no error learning at all, times one to divide by 2.5. Which builds curricular courage and makes a human being capable of going out in the real world in difficult situations, getting a lot of stuff wrong, and rapidly learning how to get it right. So, this is what I mean by leap ups. She leaped up the curriculum, and produced more learning.

We can leap further. If we can do $\times 16$ just by chance in Tennessee, I'm sure in San Diego we can do $\times 4$. So, that's what I mean by we want more leap up. So, one future is leap ups. And then, these are things that teachers can do.

Things that researchers can do in some little future areas here. These would be people working along with school districts: supervisors, and educational professors, along with teachers.

Endurance

We should study endurance. And Carl Binder gave us an excellent presentation on that kind of research thing with only 12 or 14[1]. That's okay. That's the cutting edge of the research level. Where we want most of the beginners with is Sue Ellen first, so that you learn how to do this, you understand the chart and things, and then we move up.

Counter-Turns

And then, there are counter-turns. Twenty percent--anyplace from 15 to 20% of the published literature, when a behavior change is put into a procedure, in other words, when they do a thing like overcorrection to help an autistic kid, and publish it, there's usually a jump down, and 20 to 40% of the time, a turn up. And you lose the effect of what you learn. So a counter turn. Now, if you publish fast you've got a publishable thing. If you take medians there's no effect and it doesn't matter. But 20 to 40% of the published literature has counter-turns. It jumps down, and turns up. We ought to do research on that. We've got to find out what are the conditions. If you drove it down to zero, would it not turn up? If you got all the cancer out would she still be alive? If you got all the errors out wouldn't there still be no errors? If you got all the negative thoughts out would there be no negative thoughts? And we really need to combine school and educator research for research on this topic. And that's counter-turns. So, we've got endurance, counter-turns.

Bounce

And for the real hoi-polo, so they consider it, we've got to get after bounce. One of the best researchers I knew at the time, and still with that St Elizabeths Hospital, his name was Hal Wiener. And he believed, he found out, he inspected independently of what I did, that the way to take a schizophrenic who's chronic and no behavior, if he's doing something like real low on the chart, probably it's better to bounce him and then on a day when he's heading up, hit it with a reinforcer and take him out of it. The same way you rock a car out of the--you don't have ice--but out of the mud. "nnn nyunnn nyunnnn nnn" You say, "OK", and we're pushing it forward and it won't go forward, what's the next thing you do? Push her back. Okay, push her forward. Okay, push her back. Okay, push her forward! Third time now! Back! Forward! Back! Out! Out! OUT! OUT !! Jesus!! We did it!! We did it! We did it. That's--I think behavior is exactly the same way. We should study this. What's the effect of bounce on change. It might be a little too hard for one of our first teachers to do that, but you may have a situation, maybe [] sitting here, "I'd like to work on that but I don't know how to do it." Hit Gary fast. Hit Ken fast. Hit somebody who can help you design the thing, go after it. Get Owen fast. Owen would love to have a few people work on this project. And we already have a student from Taiwan named Chung Jung Liao, CJ, who did a masters thesis on this, say, "Should we worry about bounce? Is there much bounce changing in the literature?" And she found that there wasn't much. It was maybe at the most 10 to 15% of the published articles had bounce that was getting smaller, or bounce that was getting larger.

"Verge"

So, in anticipation of this--I thought about it alot--andwe made a word for narrowing bounce and a word for widening bounce. Now, the general word for bounce change--and I know you're going to wince and I almost still do myself--is "verge." It's not in the dictionary--and "celeration" is not in the dictionary. "Acceleration" is in the dictionary. "Deceleration" is in the dictionary. But "celeration" isn't. It should be, but ain't. So, this is "verge." What's the name of bounce narrowing? Converge! (Instant instruction!). What's the name for bounce widening? Diverge! (Excellent!). How do you measure it? The same way you measure a change in celeration, or the same way you measure an accuracy shift: Divide the larger by the smaller and take the sign of the change if they're going the same direction, and so forth. So research should be done on that. And I think that those are our futures.

Now, I have one more important thing to do: Who's going to do that? Who's going to do that? So, right now I'd like the people who have never been to a Precision Teaching Conference before to stand up. Way up. You are not up to your neck in a current precision teaching project. Right? If you want to do something to help you can help in these areas, which is my way of saying, "You are our future." Thank you for coming.

Reference for this paper:

Lindsley, D.R. (1989). Wrap-up Address on Precision Teaching. Invited Address presented at the meeting of the Precision Teaching Conference, San Diego, March.

Bracket [] indicate missing or unrecognizable sections of the recording.