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The Special Interest Group for Behavior Analysis in Education welcomes members who work as educators or trainers, including teachers, administrators, special educators, faculty members in schools and colleges of education, and persons involved in industrial or military training operations.

Dr. Lawrence Fraley,
Coordinator

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OGDEN LINDSLEY ON EDUCATION

BE: What's wrong with education today? What can we do to improve it?

OL: You can reinforce teachers. The educational system, teachers, administrators, bus drivers, the whole outfit should have a major portion of their salary dependent on the learning produced by the children. Unless you do that you can't do anything with education, because the consequences are on attendance. They are not even on child performance, much less child learning.

About the only changes in public education that have any contingency on production at all are athletics and the marching bands. You can get into trouble as the band director if the band plays poorly, or doesn't win a contest. The contingencies in athletics are obvious.

BE: So the system is set up to produce more musicians and athletes than scientists?

OL: I think so. A producer in education is really a misfit because he is performing counter to the reinforcing contingencies of the environment. In the real sense he is a revolutionary, because his behavior is not under control of the agency's consequences. That's a real problem.

BE: How do you provide the right controls?

OL: You measure performance and learning and pay your teachers as a function of it. Performance has two dimensions: (1) The number they got right divided by the amount of time they worked. This is what Skinner called rate of response and the most sensitive measure of behavior. We call it frequency and it is more than just a dimension of behavior. If you describe the behavior without its frequency of performance you have not fully described it. It is like describing light without its frequency. (2) Changes in the frequency of performance charted on standard celeration charts yield straight line slopes which describe learning. We call this celeration and it has three dimensions: number/minute/week. This is the number per performance time per learning time.

Now you merely put contingencies on the learning. This would be the slopes on the children's learning charts. You pay so much for each week's gain above times two per week (each week a student doubles his performance). I know you probably couldn't do that totally in our society, but I think you could put a teacher on a \$3,000 a year retainer and pay up to \$15,000 more for pupil learning.

BE: Could you give me an example? Say you are running a private school, grades K through 6, with a staff of 6 teachers. You have unlimited resources to set up the proper controls so that teachers come under the control of "child learning." What would you do?

OL: First, you have to set up a system to measure the child's learning. We know how to do that with precision teaching techniques, daily charting.

You need a system to monitor that to make sure that the kids are not cheating. But I doubt that you would get much. Learning is so easy to produce. I really doubt that the teachers would falsify learning.

What is hard to do is to get people to reward you for having produced learning. That would be a part of this system.

BE: How would you determine the standards for pay?

OL: Obviously, you would have to adjust that and you would have the parents pay the school as a function of learning also. You couldn't pay the teachers for learning and charge the parents for attendance. I think I would require parents to pay a lot of money up front. And we would give back money for what was not taught. The parents would sign a contract agreeing that speaking and writing Spanish at a fluent frequency is worth 5,000 dollars.

Perhaps the teacher would get \$1,000 and the rest would go into the school. The point is that $\frac{1}{2}$ to $\frac{2}{3}$ of the teacher's pay would be a bonus for child learning. That assumes you can measure learning. And there is no doubt that we can measure learning clearly, honestly, and openly with minimal misrepresentation.

BE: Why not have the teachers pay the school?

OL: That's an alternative. That's the way the academy started. The professors rented halls and charged the students for lectures. The professors paid the overhead. Although we don't know if the students paid for learning or entertainment in those days, because they paid the professors directly.

I've heard that students at some of the German universities would go to one university to learn, because they heard from other students that they were more apt to learn there. But they would go to Berlin to pay to be examined, because Berlin had higher prestige and a degree from Berlin was more valuable. In other words, you would learn your operant at Morgantown or Kansas and go to Harvard to be tested.

That's where the word university comes from. The university was a collection of lecture halls that professors rented to talk in.

BE: What about teacher training? What do you recommend for training teachers?

OL: The biggest thing we are missing is a way of compacting lessons or compacting experiences into a small amount of time so that we could have precision lessons. Let me explain.

In math we take addition, subtraction, division, and multiplication which happen outside of school 4 or 5 times a month and scrunch them in a little 10 or 20 minute lesson. That's what a lesson is, a kind of intense, select set of experiences, that happen at a very high frequency compared to the real world where they happen at a much lower frequency, maybe 1,000 times lower for some subjects.

The problem is teaching the teachers to change behavior successfully. What you look at in teacher training is again child learning. But the problem is how do you do that? What we have to do is to discover some way to compress "child learning" into a math lesson. So that in one hour a teacher will have gone through teaching discussions and experiences equivalent to what they would go through in the real world in 6 months or so.

How do surgeons learn to tie knots? Well they don't learn during operations, because operations happen too seldom. The surgeons I knew used to get a match box and sit and tie knots inside a match box during their surgery internship. And they'll run off a hundred knots in five or ten minutes. That's a very high frequency. And that was their knot tying lesson. If they didn't do that, they'd never get a decent knot.

Tying a knot in a box isn't very much like tying a knot in surgery. Formally it's extremely different. Functionally, it's pretty close. Somebody discovered that if you didn't tie knots in a match box, you didn't tie very good belly knots.

But in teacher-training we have to identify the critical skills in teaching based on child learning and start teaching these skills in compressed training experiences. Try different ways and then evaluate them by looking at how the child learns. We are talking about a major research project of 25-30 years.

BE: If we started today, what might we do?

OL: First, we would need 30 or 40 children and 3 or 4 teachers of course, a small school. Then we must be assured that this can go on for at least 10 years and be assured of support for ten years. And it must be very clear that you can make mistakes.

The board, the parents, the children, should realize that occasionally we will unlearn. In fact, we will unlearn more than we will learn. But when we learn we will learn so much that the overall result will be ten times that of the public school. I guarantee you that.

But when we are learning about learning we learn by our mistakes. And the reason education doesn't learn by its mistakes is that you can't publish them. It's not honorable to have worsened a child. I once thought there wasn't a word for "worsening" a child and I started to make one up and came up with "unteach." I went to the dictionary and there it was: "unteach."

But it's worse than a four letter word for excrement around the public schools. You can't unteach. As long as you can't fail there is no way in the world you can succeed.

I think the function of science is to teach the scientist what not to do next. The function of science is not to convince someone else what they should do. Science never works that way. It's to teach the explorer how not to get across the river. He keeps doing it, trying it, and falling in and finally someday he is on the other side of the river. That's the way to cross!

I wish scientists would keep track records of their failures. Most honest creative scientists say they have three to five ideas that fail for every successful idea. This means you better have a very high frequency of ideas or you'll never get there.

BE: So until we recognize the "unteaches" and publish those we are not going to get enough "teaches" that mean much.

OL: That's right. We must have a school where people are not afraid to say "We've found a hundred ways not to teach this child." When teachers or educators are in an environment where they have to pretend that each and every day was a productive day there is no way in the world they can discover anything.

If scientists have to pretend they find something for every dollar they spend, we produce liars not scientists. And once a scientist is lying, it's a hop, skip and a jump before he is faking data.

In a recent article Szent-gyorgy, in Linus Pauling's Executive Health, criticized the way the government granting system is set up. He said we are forcing scientists to say they will look for something which they already have found. That's called staying one year ahead of your data. This is the beginning of the erosion of honesty in science. The next step is to say the implications of the research are actually further than you honestly know.

BE: What do you do with doctoral dissertation research? Students who want to do inductive research at the university?

OL: They must go someplace where they don't make you lie. I've never had a dissertation that tested a hypothesis and I have students receiving doctorates in special education and educational administration.

What you can do is introduce the research as library or survey type research, only your survey research involves numbers. Introduce it to the department this way: "Instead of going to Western Kansas and counting the number of seats in one room schools we are going into an elementary classroom and count the number of correct math problems on a page. We will do that 5 or 6 days to pick up a trend.

Now this is a descriptive dissertation. It has a long noble history. We don't have the scientific class like the guys that know about analysis of variance and all that good stuff. We don't know how to call it ANOVA or anything, because we are not familiar with ANOVAS. But nevertheless our mundane counting has value.

It's like collecting old telephone books. It's nice to know how big Lawrence was in the 20's. And it's nice to know how much arithmetic Johnny did last August.

That's how we get our dissertations done. I think you've destroyed the student when you make him dream up an hypothesis after he has done the experiment. You've started this erosion. You've taught a guy to lie and to cop-out in order to graduate.

BE: How do you teach your graduate courses? What type of evaluations do you use?

OL: All of my courses require direct behavior sampling. The students use SAFMED cards, what I used to call flashcards. But now I use the acronym SAFMED: Say-all-fast-a-minute-each-day. I changed the name to prompt students to say all of the cards daily at a high rate. The exit criteria in my courses involves one or more one-minute timings with the SAFMEDs in my presence. There is no way in the world you can bring someone else's behavior in for my one-minute observations.

Most of the courses have 4 or 6 timings. These are preceded with charted daily practice. We look at each others charts in class and make suggestions for improving. It's also important to do sample timings in class, because people initially use the cards in ways that severely limit learning. Some of these ways are: (1) think the cards rather than say them; (2) start learning a few rather than the whole set at once; (3) if you don't know the card skip it rather than guess in error; (4) say them

slowly at first, rather than fast, while learning; (5) say them 15 minutes every third or fourth day rather than a minute each day.

The word flashcard describes what you should not do with the cards: leisurely look at them, thinking of the back and if you can't think of the back "flash" the card, which prompts you with the answer. That procedure produces very poor learning compared to saying-all-fast-a-minute-each-day.

Most people can't do much over sixty. The exit criteria is 50 per minute.

In my microcomputer course they use the cards to respond to machine-specific computer operating codes. These cards contain the most used basic commands and the most used disc operating system commands. They get the cards the first night and this has caused the micro-labs to go faster. The lab work is now finished by mid-semester. Rarely do the students need help from the lab assistant. The cards have really cut down on, "What do I do now?".

BE: That gets back to your idea of identifying skills they will need to use in the real world and finding a way to teach these skills at a high frequency during training.

OL: Exactly! The nice thing about having the SAFMED cards in the microcomputer course for educators is that it proves to them that the quickest way to learn to run a computer is with SAFMED cards. And that the cards are better than the computer for drill and practice. They are portable. You can do them everyday. The microcomputer is more portable than the main frame computer, but it is not portable enough to be a daily learning help.

I think that's a nice thing for educators to see: using a very old educational technology in a new way and showing them that it is superior to the computer for daily drill.

BE: What else do the students do in the microcomputer course?

OL: The rest of the course involves projects. They write a program in BASIC, run it, and store it on a disc; and word process a one page abstract of a published article and store it on a disc. They also write a program in PILOT and another in LOGO.

They have a lab sheet each week with about 20 things to do on the computer. To get through the lab sheets in the allotted two hours means they are emitting a high frequency of computer operations. You can't spend a $\frac{1}{2}$ hour trying to get your disc copied and get through the lab sheet within the 2 hours.

Then at the end of the course they do a 10 minute think/write and a 10 minute think/say. Here they are supposed to think, talk, and write at a high frequency like a microcomputer expert. These are my final checkouts.

BE: What would a ten minute think/write be?

OL: They have 10 minutes to think and write about microcomputers: their advantages and disadvantages in the classroom. The main function of this is to convince them they have learned something by using the SAFMED cards. And the students are surprised. Their reactions are: "I'm surprised I could talk so. I really sound like I know it."

BE: Yes, I know what you mean. After writing for an hour during my written comprehensive exam I read my answer and said, "I didn't know that I knew that much about the topic."

OL: Yes. You found out that you really learned something. The first time that hit me was when I was an undergraduate at Brown University and asked to teach Psychology for Nurses. That was the first time in my college life that I knew anything. Students asked me questions and I could answer them. I knew psychology, animal learning, even Rorschach. I couldn't believe it!

Well, schooling by definition plunges you into places where you are the Ignoramus and the other person knows everything. And you rarely get rewarded with the real reason for learning, which is telling. At Brown all you did was check. You didn't tell anyone about what you knew, you checked the right answer. The first time I talked psychology was in Psychology for Nurses.

My students talk to each other and at the end of the course they talk to me during the 10 minute think/say check out. They use tape recorders and I listen to the tapes. But I'm not sure I'll continue taping. I'm beginning to relax on that requirement.

Our research over the past 12 semesters has consistently proven that if the students consistently say their SAFMED cards above 50 correct per minute they can also write above 8 per minute for 10 minutes and say facts at frequencies above 12 per minute for 10 minutes. This makes careful monitoring of the 10 minute writing and saying unnecessary. We still keep them in as final checkouts to prove to each student that they have learned alot more then merely saying cards. This validates the card-saying to the students.

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