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ABSTRACT

This paper proposes a schema that will provide the analytical clarity needed for generating insights into pedagogical issues and, consequently, for developing curriculum efficiently. The schema has four terms: learning assumption, instructional hypothesis, teaching technique, and teacher performance. A learning assumption postulates that an interpretation on the part of the learner will generate learning of some kind. An instructional hypothesis predicts the condition under which the learner's (appropriate) interpretation is likely to be secured. A teaching technique determines and projects the condition-corresponding behavior on the part of the teacher that is likely to trigger the intended interpretation on the part of the learner. A teacher's performance actualizes the technique and makes it believable, as an actor makes a role believable. The author discusses the details of the schema and provides examples of interrelationships of the four elements. (Author/VM)

CLARIFICATION: THE TERMS OF A SCHEMA FOR INSIGHTS

by Robert D. Wilson

It took quite a while for practitioners of TESL to detach themselves from absolute faith in pattern practice. The growing concern with pattern practice finally succeeded in breaking with the faith when Clifford Prator saw pattern practice as manipulation, pointing out at the same time that all that practice was not altogether appropriate practice for a terminal objective of language, communication (Prator 1965). Prator's insight was based on implicitly seeing two levels of the pedagogical schema: manipulation as a term in a learning assumption and pattern practice as a term in an instructional hypothesis. Insights like his are more easily come by when a proper schema is explicitly available. It is the purpose of this section to propose a schema that will provide the analytical clarity needed for generating insights into pedagogical issues and, consequently, for efficiently developing curriculum, any

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curriculum——and provide, as well, the terms and framework for discussing a few of the assumptions for instruction in the primary grades of Navajo schools.

The schema has four terms: learning assumption, instructional hypothesis, teaching technique, and teacher performance. A learning assumption postulates that an interpretation on the part of the learner will generate learning of some kind. An instructional hypothesis predicts the condition under which the learner's (appropriate) interpretation is likely to be secured. A teaching technique determines and projects the condition-corresponding behavior on the part of the teacher that is likely to trigger the intended interpretation on the part of the learner. A teacher's performance actualizes the technique and makes it believable, like an actor makes a role believable.

There are two theses to the schema. First, that it is the teacher's creative act in making the performance of the technique believable that triggers the intended interpretation, and the interpretation——itself a kind of learning——generates the learning promised by the assumption. Second, that each level of the schema (i.e., each term) is a system: a system of assumptions, a system of hypotheses, a system of techniques, and, even, a "system" of performance. [4]

The caveat from the preceding section bears repeating. The chain of events from the teacher's creative act to the learning promised by the assumption is as strong as the weakest link in the derivations from term to term in the schema. A derivation, say of an instructional hypothesis from a learning assumption, is not an exercise in logic, where one instructional hypothesis is the only necessary derivation from a particular learning assumption. Rather, derivation is the bold act of an intuition, a decision based on insufficient evidence.

Learning Assumptions vs. instructional hypotheses.

The confusion of learning assumptions with teaching hypotheses is apparently quite common in education, taking the form of doctrinaire instructional hypotheses. This happens because it is apparently presumed that the derivation of instructional hypotheses from learning assumptions is an exercise in logic, where one instructional hypothesis is the only logical derivation from a particular assumption. This is well exemplified in statements that inform both assumption and hypothesis as one and the same claim. For example, it is claimed that learning increases with the increase of individual attention provided in smaller classes, in smaller groups within a class, or ideally in a one teacher-one pupil ratio in a tutorial situation. The assumption:

learning increases with the increase of individual attention. The hypothesis: this increase in individual attention is effected through smaller classes, smaller groups within a class, or a tutorial situation. The doctrine: only this hypothesis will bring about the increased learning promised in the assumption.

One source of the confusion between learning assumptions and instructional hypotheses is the failure to take note that while a learning assumption is, as a rule, held true for an individual, an instructional hypothesis, in the social context of today's education, is predicted to hold true for a classroom full of pupils. So, learning increases with increase of individual attention——for the individual so attended, according to the instructional hypothesis that opts for, say, small groups in a class, in which individual attention is expressed as something physical or geographical. Thus, in a classroom full of pupils where a teacher has subdivided his class into five smaller groups, group A is getting more of the teacher's attention at any given time. Presumably, group A is increasing its learning. However, groups B, C, D, and E are meanwhile not getting the teacher's attention as implied by the hypothesis. Presumably, these groups do not profit increased learning. Indeed, these four groups profit less learning than if the teacher attended to the class as a whole, distributing what little of his attention is available to each in such a large class.[5] An important question is raised. Is the increased learning in group A alone greater or less than the increased learning for the whole class if attended to as a whole? The point here is the question, not the possible answer to the question. The question suggests that the proposed instructional hypothesis, teacher-pupil ratio, might not be adequately expressing the assumption of increased learning from increased individual attention. It implies that there might be another instructional hypothesis which would be adequate.

If individual attention is not to be expressed as something physical or geographical in the specific form of teacher-pupil ratio, how else might individual attention be expressed? Note, first, that attention implies attention felt by the students (since ineffective attention would promise no increase in learning). Note, second, that individualized attention implies attention felt by each and every student as applying to himself. Given these two observations, individual attention might simply mean that each and every child in the class believes that he has a secure place in the mind (and heart?) of the teacher. Secure. . . a guarantee that nothing, but nothing, will threaten that security, not failure to succeed, not failure to behave, not failure to conform, nothing. Such a feeling of security does not occasion remarks like "The teacher doesn't like to call on me" nor the compulsive "Teacher likes to call on me first." Appreciate the challenge of these remarks, considering that even some of the

best intentioned teachers fall into patterns of calling on mostly one category of pupils in the class. For example: mostly the brightest pupils or mostly the slowest ones because the teacher likes to provide challenge; mostly the best behaved ones or mostly the most troublesome because the teacher means to keep control; mostly the well-adjusted or mostly the maladjusted because the teacher wishes to be a parent. The challenge: "Call on me to participate on the same chance that anyone and everyone of my classmates has. Do not select among us, not even me, on the basis of any criterion whatsoever. Don't make me dependent on any criterion for a place in your mind and heart. Such dependency makes me insecure, distracting me from the objective of the lesson, from learning, and eventually from caring about learning——caring, and attending, only to the criterion you have set up."

To meet such a challenge, I have provided the curriulum with an instructional hypothesis: randomization of pupil participation assures individual attention for all members of the class. Randomization of pupil participation means that every child in the class has equal chances of participation, equal to every other child, virtually all the time.[6] It means, further, that every child in the class believes he has an equal chance of participation because he recognizes randomization for what it is, a game of chance. If the hypothesis is found to hold true, then, on the basis of the learning assumption that increased individual attention brings about increased learning, it may be inferred that to the degree that the pupils feel assured of individual attention, they will profit increased learning. The difference between this instructional hypothesis and that of teacher-pupil ratio is the degree to which they can assure individual attention to each and every child in the class. Whatever the difference and whichever assures greater individual attention, it has been demonstrated that more than one instructional hypothesis can be derived from one and the same learning assumption.

Instructional hypotheses vs. teaching techniques.

However, neither the teacher-pupil ratio nor the randomization hypothesis is a hypothesis in the sense of testable, at least not by current experimental methods in pedagogy. Both of them need to be behaviorally defined. And both of them should be placed in very specific contexts, also behaviorally defined. If they are to be compared, their contexts should be identical or near identical, depending on the rigor required.

The behavioral form of an instructional hypothesis is a teaching technique, and the technique is tested in a specific teaching situation which, itself, includes other teaching techniques.

An experiment attempts to determine the effect of the teaching technique in the teaching situation. Confusion arises when the experiement is believed to have determined the effect of the instructional hypothesis rather than of the teaching technique. This is generally due to the behavioral orientation of interpreters of experiments: disinclined as they are to recognize a more general, nonbehavioral, yet insightful instructional hypothesis underlying the more specific, behavioral, also insightful teaching technique, they make the teaching technique the underlying principle itself. This confusion of technique for the more general hypothesis reveals itself among some educators in their obsession with particular media——either for or against them——for example, color coding, workbooks, primers.

The confusion of teaching technique for instructional hypothesis is sometimes traceable to the presupposition that there is only one technique for an instructional hypothesis. But this is just not the case. For example: one technique for effecting the instructional hypothesis of randomization is to have the teacher select students for participation by picking out a card from a deck of cards (like an honest card dealer would), each card with a pupil's name on it; another would be to pull out a slip of paper from a paper sack full of slips of papers with the pupils' names on them; still another would be for a blindfolded student in the middle of a circle of his peers to turn several times with one hand outstrectched, stopping to point, unpredictably, to one of them; and why not a crap game between each pupil of a pair, the winner of each pair playing against another winner, and so on until only one winner remains. All of these techniques but the last one have the advantage of brevity, leaving enough time in the period for the objective to be learned. The last one, however, will take most of the class period, leaving very little time for learning. Should the last technique be the one used in a pedagogical experiment, the effect of randomization on learning would be minimal, that is, nonsignificant. Should such an experiment be interpreted as a demonstration of the ineffectiveness of the instructional hypothesis? Or of the teaching technique?

On the other hand, a technique that is demonstrably effective in an experiment elicits a degree of confidence in the underlying instructional hypothesis——but not to the exclusion of other representative techniques that may also be demonstrably effective. The exclusion of other techniques as representative of one and the same instructional hypothesis when one technique has already been demonstrated effective probably arises when the experiment is believed to be generalizable to other contexts: that is, the same technique that proved more effective in a specific

context is applicable, unchanged, to another context. The same technique may prove effective in the next context, but then again it may not. Stated this way, hypothetically, the non-generalizability of a technique elicits academic agreement to the thesis. For example, the demonstrable effectiveness of the technique of written texts for the instructional hypothesis of programmed instruction among able readers does not turn out as effective a technique among weak readers, for example, beginning ESL learners in highschool classes where number systems are taught through programmed texts in English.

The tasks of formulation and reformulation.

One can begin to appreciate the tasks of formulating and reformulating teaching techniques, instructional hypotheses, and learning assumptions by realizing the implications of the thesis that there is more than one possible derivation from term to term in the schema. This is the thesis that has been argued so far in this paper. An example of the implications of this thesis in the formulation of a teaching technique from an instructional hypothesis is here presented to plant the seed of appreciation.

The example. The questions below are relevant to the formulation of a technique (or set of techniques——depending on one's unit of behavior) for the instructional hypothesis recommending a smaller teacher-pupil ratio in a classroom, specifically, smaller groups within a class.

(a) Will the class be divided into two, three, four, five, or more groups?

(b) What criteria will be used to determine the groups?

(c) Will the pupils be informed of the criteria for the grouping? If so, how will the criteria be presented?

(d) Which sugroup will the teacher attend to first on any given unit of time, say during a day, which second, which third (etc.)? Will different groups be attended to first on different days? if so, how will this be determined?

(e) Will the teaching differ for each group or only for some of the groups, or not differ at all?

(f) Will the groups not directly attended to by the teacher at any given time be self-teaching? Or will busy work be allowed? How will self-teaching be distinguished from busy work?

Still more questions come to mind should the division of the class into small groups be changeable:

(g) Will the different groups be formed daily, weekly, or monthly? Or will some particular behavior, like a symptom, signal the need for a new division of the class?

(h) Will the same criteria to determine the groups be used each time a new division is formed? Or different criteria?

(i) Will the time taken to determine the groups at different times be significant enough to affect, negatively, the promises of increased learning? If so, how can this be avoided?

(j) Will teaching change as different groups are determined according to different criteria?

Appreciation of the tasks of formulating and reformulating the components of each level (i.e., each term) of the schema deepens with a consideration of a second thesis of the schema, that each level is a system —— a system of techniques, a system of hypotheses, and a system of assumptions. For example, take questions (e) and (j) above, both of which ask about teaching itself. If the teaching will differ for the different groups or if the teaching will change as the groups change, how will the teaching change? An entire spectrum of teaching techniques becomes a kaleidoscope of questions. And the answers to these questions, a specific set of techniques, can make or break the previously determined technique (whatever it was) for implementing the teacher-pupil ratio hypothesis. Thus, the formulation of a technique requires the formulation of other techniques related to it, that is, the task is one of formulating a system of techniques. It is easy to believe that if the teaching techniques are all of a system, the instructional hypotheses from which they are derived are quite likely to be all of a system themselves——*pari passu* for learning assumptions.

On the level of instructional hypotheses, relatedness between hypotheses can also be shown. Take the instructional hypothesis of randomization explained earlier. It gives everyone in class an equal chance to participate, yes, those who feel ready as well as those who do not feel ready. When the latter are called to participate, an important learning assumption is violated: a student must feel ready to participate if he is to improve his learning, perhaps even, if he is to learn at all. What is needed, then, is an instructional hypotheses derived from the learning assumption of felt readiness. So, I have provided the curriculum with an instructional hypothesis that purports to reflect that assumption: volunteering to participate. This hypothesis requires the teacher to permit a student to refuse to participate when, as a result of randomization, he is expected to participate. (It also requires the teacher to call on only those students who are volunteering to participate in the situation where only the teacher's sense of randomization is the means of selection——but this aspect of volunteering is not relevant here.) On the other hand, volunteering without randomization would make boldness a criterion for belonging, violating the learning assumption that learning comes more readily when the student feels like an individual: that he belongs simply because he is he.

The learning assumptions are systemic in that they form a hierarchy of categories. First, there are those learning assumptions which postulate the interpretations that make it possible for learning to take place: its initiation, its continuance, and its termination. Learning might be said to be initiated by interpreting a phenomenon, say something heard, as having a particular feature, for example, a car engine with a noise pattern like that of a neighbor's. The learning might be said to be continued by evaluating the feature as worthy of checking, for example: if it is the neighbor's car, he is home earlier than usual. The learning might be said to be terminated by checking the hypothesis that it is the neighbor's car or by deciding not to check the hypothesis. The latter decision leaves the individual with only an hypothesis, the former with a conclusion; in either case, learning has occurred.

Then there are those learning assumptions which postulate the interpretations that make it possible for learning of a certain kind to take place. For example, what interpretation might be postulated for product-learning that is capable of generating more learning of the product, for example, for counting 1, 2, 3, 4, etc? Possibly, it might be assumed that the interpretation of the product, the subject matter, as having structure, a principle, a generalization (and a particular one at that) is the interpretation that would make product-learning capable of generating more learning of the product; for example, to interpret counting 1, 2, 3, 4, etc. as an instance of addition by 1 (or, even more generally, of addition) would make the student capable of counting with numbers he is not familiar with, say 194, 328, 576.

There is a relationship between the two kinds of learning assumptions above. Learning assumptions that postulate interpretations which make it possible for learning to take place are prerequisites to the learning assumptions that postulate interpretations which make it possible for learning of a certain kind to take place. This seems like an obvious relationship, and it is, but it is apprently not kept in mind by some practicing educators when formulating (implicitly, probably) their instructional hypotheses (and the condition-corresponding techniques). Take the professor who describes structure XYZ of his subject matter in a lecture but fails to point out that he is describing structure XYZ or at what point in his lecture he is describing it——to initiate learning. Or take the professor who does point out structure XYZ but fails to justify, interest, or motivate the students to consider structure XYZ as worthy of checking out——to continue learning. Or the professor who does both of the preceding but fails to provide an opportunity for checking out the accuracy of the students' understanding of the structure, say by providing examples which the students have to identify as having or not having structure XYZ——to terminate learning. In any case, the relationship suggests the systemic character of the learning assumptions.

The reformulation of the components on each level may start with the learning assumptions. A new assumption may suggest itself, an established assumption may be seen in a different light, a former and rejected assumption may now appear valid. What follows is a reexamination of the system of instructional hypothesis, sometimes resulting in a modification. This, in turn, prompts a reexamination of a specific technique and the rest of the system of techniques, sometimes resulting in a new design. Or the reformulation may start with an instructional hypothesis. A particular hypothesis may be inadequate, failing to provide the stated interpretation. Or it may be superfluous, another instructional hypothesis already supplying the stated interpretation. Or one instructional hypothesis may be inconsistent with another, one nullifying the effects of the other. What follows is a reexamination of the system of assumptions and the system of techniques.

The motivation for reformulating techniques is empirical, or should be. This is the level of the schema which is testable. As the techniques of a curriculum get tested, whether rigorously or loosely, a pattern for modification may be revealed. The key to discovering a pattern and selecting the most promising new design of techniques is a familiarity with the system of instructional hypotheses from which the system of teaching techniques has been derived. Modifying the system of techniques means a reexamination of the system of instructional hypotheses, making it, in turn, subject to possible modification itself. With possibile ramifications for the system of learning assumptions.

The seriousness of inconsistency is difficult to overestimate. As inconsistency repeats inconsistency in teaching, inconsistency begins to infect related areas like discipline, affection, esteem...and eventually inconsistency repeats inconsistency on all levels of communication between teacher and pupils... until finally mood and feeling alone dominate. The effect on the pupils? Anxiety.

Or, worse, as inconsistency repeats inconsistency, the importance of the teaching act, and its intended product —— learning, becomes suspect: "What does teacher really want? Not learning. Not all the time anyway. Sometimes teacher just wants me to speak up loudly. Sometimes to make mistakes...when I get something right, teacher finds some other mistake I've made...I guess I'm stupid. Sometimes to behave...calling on me when I'm not paying attention... what I say is not important so long as I start paying attention again." Learning as the meaning of class activities loses importance and other meanings for the school experience gain importance. Eventually, the primacy of learning loses its hold on the students and the primacy of conformity to teacher's wishes takes over. Only the teacher's personality can hold the class now, and if that loses its attraction (as is likely with inconsistent personalities), the pupils' chances of maturing into self-learners are those of a poker addict playing against a crooked dealer. But, unlike the poker addict who can't quit playing poker, the learning addict (he is born an addict) may very well decide to quit the game of learning when he realizes the odds against inconsistent teachers. If he is blessed with wisdom, appreciating the high stakes involved, he only quits school, not learning.

On the other hand, a consistently credible teacher, especially one so confident in his techniques that he consistently expects learning as the appropriate interpretation of his teaching, emphasizes the importance of learning, underlining it with talent, effort, time, and sincerity. There is no better way to keep students hooked on learning.