The Curriculum as the Cause of Failure

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When children do not learn, it is evident that they have not been taught. In other words, the teaching failed. But why does the teaching fail so frequently in the traditional classroom, and why is such a large number of students labeled disabled, dyslexic, or immature? I believe that the principal cause of failure is the curriculum. I do not believe that the children who fail are "odd" in their orientation to the world, that their learning styles are different in type from those children who succeed, or that their failure is their fault. I further believe that the reason the curriculum has not been addressed as the cause of failure is that the traditional educator is not highly literate in the technical details of curricula or how to change them.

How the Curriculum Causes Failure

To appreciate the role of the curriculum in providing misinformation and inadequate practice, we start with the obvious fact that the purpose of the curriculum is to communicate with the learner. More specifically, the curriculum is supposed to convey information about concepts that the learner does not possess. To appreciate the problems the learner may experience, we must look at teaching interactions from the standpoint of the naive learner, not from that of someone who already knows that information or skill.

Situation A

The teacher presents the learner with a card that displays 5. The teacher tells the learner, "This is four." On subsequent interactions with the learner, the teacher either refers to the figure as "four" or reinforces the learner for identifying it as "four." If the learner had no pre-knowledge of the symbol's name, and if the learner learned exactly what the teacher taught, the learner would learn that 5 is "four." Later, the learner would probably have to relearn the symbol name, and this relearning would require substantially more time than the time required to induce the misrule.

Although this scenario seems incredible because the teacher obviously presented the learner with information that is not accurate, it has all the features of the type of mis-learning that is induced by most traditional curricula. These features are:

1. **The learner learns exactly what the teacher teaches.** The mis-learning is not caused by the learner's mind running wild or being unable to process the information. Rather, the learner learns what the teacher teaches, as documented by facts of what happened during the teaching.

2. **The communication with the learner is the basis for inducing the mis-learning.** The learner did not spontaneously generate the misconception about 5 but rather received the information through an interaction with the teacher.

3. **The mis-learning is very expensive in time, because the re-teaching of the misunderstood concept requires far more time than the teaching of the original concept.**

Situation B

The teacher has two numbers on the board:

$$\begin{matrix}4\\5\end{matrix}$$

The teacher stands some distance from the board and points to the board, saying, "That's four. What is it?..." On subsequent lessons, the teacher repeats this demonstration or asks the learners in the classroom, "What's that number?" The children, of course, respond, "Four."

If all the children in the classroom were naive and could not identify any numbers before the demonstration, we would be amazed if all of them learned that 4 is called "four." We'd also be amazed if all learned that 5 is called "four." We could expect that some of the children would learn that 5 is "four," some would learn that 4 is "four," and some would learn that $\begin{matrix}4\\5\end{matrix}$ is "four." The children's experience with reading would affect the percentage of those identifying 4 or $\begin{matrix}4\\5\end{matrix}$ as "four." (Reading lists of words starts at the top.) However, the children who identified 5 or $\begin{matrix}4\\5\end{matrix}$ as "four" could not be viewed as learning disabled. Their use of information the teacher provided was no different than that of the learners who learned that 4 is "four." All learners were in the position of having to "guess" about the concept.

Scenario B adds two ingredients to those listed for situation A. They are:

1. **The teacher didn't provide the learner with information that is inaccurate.** The teacher didn't lie when saying, "That's 4," because a 4 was present. Although the statement obviously had more than one possible meaning, the statement was "accurate."

2. **The presentation is ambiguous and therefore provided the learner with a choice of "interpreta-**

tions." The question of the salience of these choices is irrelevant. One choice may be more naturally attractive to the average learner than the other. In fact, however, all choices are consistent with the presentation; none is contradicted by what the teacher does or says. Therefore, the learner who learns any one of them is learning exactly what the teacher is teaching (even though the teacher's intent is to teach only one possibility).

Virtually all the mis-learning that is created by the traditional curriculum follows the format of situation B. The teacher presents information about concepts **that the teacher understands.** The presentation is ambiguous to the naive learner. The ambiguity may result from a variety of features in the presentation. The presentation may not provide concrete information; the presentation may stipulate a particular set of examples although the concept being taught is supposed to apply to a very broad set of examples. The presentation may unintentionally prompt the learner to use a spurious operation that will permit the learner to obtain the right answer.

For example, the traditional teaching of any subject reveals an appalling number of ambiguous communications (National Council of Teachers of Mathematics, 1989). Here are some examples from beginning arithmetic: that display the order misrule: Teachers sometimes present numeral identification in the order of the counting numbers. The numerals are displayed in this order: 1 2 3 4 5. Children identify the numbers from left to right. Although many of the children already know how to identify some of the symbols, some children don't, but they know how to count, which is what they identify as the concept the teacher is apparently doing. These children will not learn that the **shape** of the symbols determines the name, but learn that the **order** does. The first symbol is called "one," the next is "two," the next is "three," and so forth.

The teacher who follows the curriculum (a) has no ready way of knowing that these children are operating from a "misrule" and (b) **actually reinforces children for using this misrule. Consider** this interaction:

> Teacher: James, tell me the names of these numbers as I point to them.
> (Teacher points as James says, "1, 2, 3, 4, 5.")
> Teacher: Very good, James. You really know your numbers.

The strategy that the teacher is reinforcing is that of identifying the objects in order. It would be possible to infer the nature of James' misrule from some tasks. One would be to present the numerals in this order: 3 5 4 1 2 and ask James to identify them. If James said, "one, two, three, four, five," we would be provided with precise information about the misrule, and also with confirmation that the misrule is consistent with the information conveyed by the teacher.

Delayed Information

If the teacher follows poorly designed curricula, the tasks in the program do not reveal the problems the learner may be experiencing and the learner's problem is not identified until later, at which time, the learner is often blamed for having a learning problem (Colvin & Horner, 1983).

As situation B shows, the problems created by poorly designed curricula may be difficult for the teacher to identify because the learner may be performing perfectly on the initial activities. Another example of spurious performance is early addition facts. In many traditional sequences, the facts are presented in the order: 1+0, 1+1, 1+2, 1+3, 1+4, and 1+5. This presentation is capable of generating the same misrule as the numeral-identification misrule. The answers are always the counting numbers: 1, 2, 3, 4, 5, 6. If the program the teacher uses presents the problems in the same order as they are introduced, the learner who picks up on this misinterpretation will perform perfectly, and the teacher will have no indication that the learner does not understand the concept of adding one or understand any of the facts that add one. This information may not be revealed until the children receive a test on the first addition facts taught.

Here are Amy's responses to the problems presented on the mastery test (which presents the problems in a non-counting order):

1+3=2 1+2=3 1+5=4 1+4=5 1+1=6

Amy got two problems correct. The teacher probably would not observe that the answers are in the counting order. Instead, the teacher might assume that Amy has attention problems or that she is not functioning for some other reason—conflict at home, anxiety about taking a test, etc.

Another student, Betsy, did not miss any items on the test; however, Betsy had a serious problem that did not emerge until much later in the arithmetic sequence. When the program introduced the problems: 1+6, 1+7, 1+8, 1+9, and 1+10, Betsy got all the answers right both during the instruction and on the test that followed the introduction. Also, Betsy had no trouble on the cumulative test that presented the facts 1+1 through 1+10 in the non-counting order. Betsy's problem emerged when work with facts that begin with 2 (2+4, 2+5, etc.).

At first, Betsy made many mistakes, such as indicating that 2 + 3 equals 4. After additional work, Betsy seemed to get the hang of working these problems; however, she made what the teacher considered bizarre mistakes on the test that presented both 1+ and 2+ problems. Betsy missed some of the 1+ problems that she got right earlier. Specifically:

1 + 4 = 6 1 + 7 = 9
1 + 5 + 7

She made no mistakes on any of the 2+ problems.

The curriculum caused this problem just as it caused Amy's problem. When the children worked on 2+ facts, they worked on only 2+ facts, not on 1+ and 2+ facts presented in different orders. Betsy was never shown the difference between 1+5 and 2+5. The strategy that Betsy had used to work the first set of 1+ problems was to: (a) look at the second number, and (b) write the next number in the counting order. For the problem 1+4, she looked at the 4, said, "5" to herself and wrote **5** as the answer. The initial work with 2+ facts seemed to contradict the rule that the answer is 1 more than the second number. Then it became clear to Betsy that the appropriate procedure for all problems is to look at the second number and (for some arbitrary reason that she didn't understand) count 2 places—not 1. For 2+6, she looked at 6 (not the 2), said, "7, 8" to herself and wrote 8. Betsy was able to work all the 2+ problems using this procedure. The curriculum did not present a demonstration or task that ruled out the possibility that Betsy's procedure is appropriate for 1+6 as well as 2+6. (For Betsy, both would have the same answer—8.)

Here is a series of problems that would have contradicted Betsy's misrule:

2 + 6	1 + 6
1 + 4	2 + 4

Pre-Correcting Problems

If the learner learns what the teacher presents, and if the curriculum specifies tasks, activities, or sequences of events that create misinterpretations, the most sensible solution to the problem would be to design the curriculum so it "contradicts" misconceptions before they occur. This approach is far more efficient than misteaching children and later providing some sort of remedial work. To avoid Amy's problems, we could simply introduce the facts in a non-counting order. To avoid Betsy's problems, we could initially show the "difference" between 1+ statements and 2+ statements by presenting counterparts.

1 + 5	2 + 8	2 + 3	1 + 6
2 + 5	1 + 8	1 + 3	2 + 6

The teacher would explain that problems that start with 2 have an answer that is one more than the problems that start with 1. To work each pair, the teacher would direct the children to "find the problem that starts with 1 and write the answer to that problem." The teacher would then give feedback. "You should have worked 1 + 5. The answer is 6. The other problem in the pair starts with 2. The answer to the problem is 1 more than the problem you worked. What's 1 more than 6?... Write the answer to 2+ 5....You should have written, 2 + 5 equals 7." After completing all the pairs, the students would read the facts.

This presentation could not support the misrule that Betsy learned because this presentation contradicts her interpretation. From the beginning it shows her that:

1. What you learned about 1+ problems is still in force and is not being superseded by a new procedure.
2. The problems that start with 2+ are different from those that begin with 1+.
3. The difference is a stable relationship—answers to 2+ problems are 1 more than answers to corresponding 1+ problems.

The procedure for re-doing the sequence of activities for teaching 1+ facts and 2+ facts so they cannot support the misinterpretations that Amy and Betsy had involves these steps: (a) Recognize the misinterpretations that are consistent with the presentation or explanation provided in the program; (b) change the presentation so it actively contradicts the possible misinterpretation; (c) tryout the revised sequence with children; (d) identify patterns of errors that individual children make, and compare them with the explanations and activities presented in the revised sequence; and, (e) revise any details of the new curriculum that generate misinterpretations. If all these steps are taken, the revised program will work well.

Mastery

If the four revision steps are not taken, the sequence is not improved by requiring teachers to teach to mastery. Here's why: The curriculum is capable of generating misinterpretations that may not be immediately revealed by the performance of the children. (A learner like Betsy can perform **perfectly** for a long time.) Therefore, any work on mastery may simply strengthen the misunderstanding that some children have. Betsy, for instance, would not have benefited from working longer on the early parts of the program.

Although the goal of the curriculum should be to teach children to mastery, not simply expose them, the poorly designed curriculum often provides for spurious mastery because the success on earlier tasks does not reveal the underlying and serious misinterpretations individual children may have abstracted from the presentation. Therefore, mastery on these tasks does not facilitate later learning for some children, but actually interferes with it or retards it (Colvin, 1983).

Scope of Misrules in Traditional Programs

Traditional instructional approaches are replete with communications that generate misrules. The student who is labeled learning disabled or with a specific learning disability provides a detailed tribute to the mis-teaching they have received. Basically all of the learning behaviors reflect earlier teaching and often are examples of doing exactly what teachers told them to do in reading, math, and science (Engelmann, Becker, Carnine, Meyers, Becker, & Johnson, 1975).

Here are some of the more common misunderstandings that are generated by currently popular reading programs.

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Initial Reading

1. Reading is reciting a memorized piece as you point to the marks on the page and say one word for each major mark. This interpretation is consistent with the "Language experience," or "Whole language" approach to initial reading. Children memorize poems or accounts. The material that is read is cued by pictures that prompt the topic.

In the late 60s, we went into a language-experience classroom that had "taught" the children five stories. The children were quite good at "reading" these selections. We switched the pictures and texts so that there was no "prompting" of the appropriate text. About half the children pointed to each word of the selection, and with great fidelity, recited the script appropriate for the picture. In other words, about half the children hadn't learned anything about what reading is. For them, it was nothing but a strange recitation game. Furthermore, their performance was perfectly consistent with the teaching and reinforcement they had received. The teacher told them that they were reading very well.

2. You must have pre-knowledge of the concepts the text presents. In other words, before you can read something, you must **understand** the various "meanings" that you'll encounter in the text. This misinformation is conveyed by showing children that discussions always precede "reading," that the discussion deal with the details that will be "read," and that pictures show some of the material that is discussed and later "read."

From the first day of reading instruction that is based on a whole-word or sight-word method, a perfectly spurious order of events is followed. Students discuss a picture that actually shows what the text covers before reading. The statements that are generated during the discussion are sentences that will be read. Children then read and are reinforced for paraphrasing or "guessing" at words.

3. When you read a selection, you try to guess about the words that are appropriate to say, using the picture, the pre-reading discussion, and the appearance of some words key to your reading. The mistakes the learner makes provide clear evidence of the learner's strategies. Typically, the learner doesn't have the basic understanding that a word unit like *cat* has one "name" and that the name derives solely from the order of the letters. The learner usually reads cat as "cat" but sometimes reads it as "kitty" and sometimes as "kitten." The word ***a*** is sometimes read, "a," and sometimes, "the." The word ***little*** is a size word, sometimes read as "small," sometimes even as, "big." The learner is more confused about connected sentences than lists of words. Virtually all "corrective" readers read words more accurately when they are in lists than when they are in connected sentences (Engelmann et al., 1975). This fact provides evidence that sentence reading is more difficult for the learner. The nature of the synonym and "meaning" mistakes suggests that the sentence-reading strategy is painfully involved and that the learner doesn't have the basic notion that the word is the word and that it is always spelled the same way. For this learner, reading is involved "coping" and a complicated process that first requires some inspection of the word so that it is "recognized," then a search for the **meaning** of that thing—not for the pronunciation of that thing. After finding the meaning, the learner then goes on another search for the pronunciation of the things that could have that meaning. During this process, the learner may link the word meaning with the pronunciation that is "incorrect"—calling the word *cat*, "kitty" or the word *a*, "the."

This laborious, and perfectly inappropriate procedure is consistent with what the learner had been shown about reading. Somebody told the learner to look at the beginning of the word and "guess." "What could that word mean?" the teacher asked. Other teachers told the learner to use sentence context clues to figure out the word, and to look at the beginning of the word or the general shape and use that information as a basis for identifying the word. These rules are neither accurate nor necessary. Good readers do not perceive words by general shape but rather by the precise succession of letters, even when reading at a high rate. In very limited contexts, the "What could that word mean?" strategy is appropriate, but certainly not for the beginning reader who has none of the background information needed to make intelligent choices or to rule out possibilities. Asking this reader to identify words on the basis of context is tantamount to asking the average six year old to judge the adequacy of safety rules for a power plant.

Solutions

As with other problems of miscommunication with the learner, they can be corrected by identifying them and providing tasks or activities that actively contradict or preempt them. Here are some of the specific changes that would result in the program:

1. Children first decode words, then focus on meaning. The steps of decoding and "understanding" would not be amalgamated during the early work. Several activity formats could achieve this goal but all would involve the reading of words with no discussion of their meaning—only their "sound" or the "sounds" of the individual letters, or the "spelling" of the word as a key to its pronunciation.

2. No general clues would be provided for looking at the whole word, guessing, or extrapolating from the

initial sound of the word. The word would be approached a letter at a time, from left to right.

3. No pictures would be shown at the beginning of reading selections. If pictures are provided they would occur in the most reasonable position—after the selection had been read. After all, the text tells what the picture would show, and not vice versa.

4. When reading connected sentences, the read-first practice would be followed initially. No pre-reading discussion of the context would be provided. Rather, children would read the title and use that information to judge what the selection is about. Next, the children read the story, then they read it again and answer comprehension questions, including the final question: "What do you think the picture for this story is going to show?" The read-first strategy assures that the learner will derive the meaning from the sentences that have been read, not from spurious cues. The picture will show something about the main event of the story; the learner understands the main of the story; therefore,, the learner can predict the picture. After reading about a goat that had three red hats, the learner would probably predict that the picture would show the goat with its hats. In this context, intelligent guessing (or predicting) is perfectly permissible. Furthermore, the role of the picture is framed for the learner. The picture is not the basis for the story or the source of meaning; it is merely something that is consistent with the story.

5. The comprehension activities presented with the reading selection would be the type appropriate for the discourse. The initial selections should not be designed to "teach" students how to comprehend. The test of whether the student should be in the beginning reading program is simply: If the stories were told to the learner, would the learner be able to answer the "reading" comprehension questions. With a few exceptions, reading comprehension of beginning-level stories is simply language comprehension. The children are not required to learn anything new about comprehension, merely to apply what they know about a verbally presented story to a story that is read. If the story is decoded accurately, it has all the essential "meaning features" of the verbally presented story. Children should be able to answer questions about what happened, who the "actors" are, and what they did. The only attempt to teach anything new about comprehension to the beginner would be associated with those conventions of the written word that have no parallel in spoken language. Quote marks, for instance, do not occur in oral language; therefore, they imply some instruction before children encounter them in stories. (Too often, this teaching is not provided by traditional programs.) Associated with the introduction of quotes would be comprehension questions. For example, after the children read: The goat said, "I am not a boat," children might be presented with two tasks: "Say the whole sentence you just read.... Say what the goat said...." (If this pair of tasks were presented to fourth graders who went through a traditional sequence, most would respond incorrectly, suggesting deficiencies in what they had been taught.)

Note: Comprehension is important; however, the treatment of comprehension as it is presented in traditional reading programs is insulting. Thorough comprehension of a story presented in the beginning levels of these programs requires precisely no new comprehension learning. Yet, the child would have exactly no access to the story without first being able to decode it. Most of the essential learning that must take place, therefore, is on decoding, not comprehension; however, the pretense of these programs is that they teach comprehension. This presumption is lavishly contradicted by the later levels of the program, which provide students with almost none of the comprehension teaching that would be required for them to understand their science text or simpler documents that attempt to teach (that introduce new words, rules, etc., and apply them to concrete situations). Precious little work is done to prepare children either for the content that they will encounter or for the format or the syntax of what they will read.

Inferring Teaching Deficiencies from Performance

The same miscommunications that are observed in traditional reading approaches arefound in mathematics instruction and science instruction. As a general description, none of the more widely used curricular sequences has been shaped by observing the mistakes that children make, by determining the extent to which the mistakes are supported by what the program "taught", and by redoing the curricular sequences to they actively preempt and contradict these misinterpretations.

Furthermore, much of what students have been unintentionally taught can be inferred from their performance. The performance of eighth-grade math students who are removed from the traditional sequence and put in a sequence that is appropriate for their skill level reveals both what these students had been taught about approaching mathematics and how strongly they have been reinforced for using inappropriate strategies.

1. The first thing one notices with these students is that they are seriously deficient in following directions. You may tell them, "Listen: Copy the problem just the way it is written on the board, then stop. Raise your hand when you've done that much." When you observe the students' performance, you'll note that possibly half of them did not follow your directions. The consistent inability to follow clear directions is the

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1. The first thing one notices with these students is that **they are seriously deficient in following directions.** You may tell them, "Listen: Copy the problem just the way it is written on the board, then stop. Raise your hand when you've done that much." When you observe the students' performance, you'll note that possibly half of them did not follow your directions. The consistent inability to follow clear directions is the

first indicator of poor instruction. **Not only are the students unpracticed in following directions,** they are poorly prepared for new learning. Here's the argument: Following directions is essential to learning complex problem-solving strategies in a timely manner; these students have obviously been taught in a way that does not require them to follow directions precisely and has left them with direction-following deficiencies; therefore, **the teaching they have received has not prepared them well for learning.**

2. Next, you'll observe the inability to apply things that are taught in one lesson to the next lesson, even when (a) the work on the earlier lesson is successful and, (b) you tell the students that they will use what they are being taught. During the subsequent lesson, many of the students (perhaps most) will inform you that, "I don't remember how to do that." Their lack of ability to retain and apply reinforces the diagnosis that **what they had been taught earlier did not involve learning and applying.** Students who are practiced in the format of learning something and then using it don't exhibit the "forgetfulness" of traditionally trained children. Their behavior further implies that they understand what teaching is all about. You're taught something not merely because of some capricious whim of the teacher to expose you to something new, but because what you learn is integrally connected to what you will learn. The earlier learning provides the stuff, the components, and the operational details that will later be orchestrated into more complex structures and used to solve more complicated problems. The well-taught learner understands this relationship because it has been a predictable feature of the teaching sequences the learner has experienced. What is done today is to be learned because it will be used for many tomorrows and in many ways. The poorly taught learner does not understand this order of events and therefore has a very jaded notion of what teaching is and why teachers have presented different activities and exactly what information the learner is expected to attend to, derive, retain, or apply.

3. You'll notice a great deal of helplessness in the students. They are quick to raise their hand and ask for help, very unsure of how to proceed. Typically after you tell them to do something, most of them will exhibit a long latency before responding. They do not pick up their pencil and start writing; instead they stare for several moments, then look around to see what their neighbors are doing. If they have an active neighbor, they will most probably copy what that student is doing, even if it is wrong.

4. The final global thing you'll observe is that they exhibit tendencies of learners who are in an **unfamiliar learning setting.** When engaged in highly unfamiliar learning, learners don't show rapid improvement. The mistakes they will make today predict the mistakes they make tomorrow. Last year, we worked with one group of fifth graders from a low-income school and three classes of sixth graders from high income schools. All students were placed in the same instructional sequence. None of the students had been in this sequence the preceding year. All had good teachers. The fifth graders outperformed all of the sixth graders by a wide margin. The difference seemed to be that these students had spent less time practicing inappropriate strategies. Although their performance was initially as poor as that of the sixth graders, it speeded up a lot. The rate of the average sixth grader didn't improve as much, an indication that the amount of relearning required to be an efficient learner and applier was greater for those students and required more practice than they received in one school year.

Summary

Instructional sequences have the capacity to make children smart or not. If students learn from their interactions with the content that (a) they are expected to dabble, (b) there is no requirement to retain what is learned today and to use it, and (c) there is no requirement to follow the teacher's directions, the children will perform at a level that will permit them to be labeled as specific learning disabilities by the time they reach the eighth grade, which, according to the National Assessment of Educational Progress math evaluation is true of the average U.S. student (NAEP, 1991). If the program sensibly counteracts not merely the content errors that poorly designed programs might induce, but also the more general attitudes about learning and retaining information they promote, children can become impressively proficient in academic skills. The curriculum will largely determine the extent to which children are smart. Unfortunately, the more popular curricula are not well designed to make them smart, but provide teachers with very serious misinformation about how to teach well.

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