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ABSTRACT

An experienced second grade teacher participated in three two-hour planning sessions in which she planned for the course of instruction for the school year in mathematics, science, and writing. The teacher "thought aloud" as she planned, and two researchers present took written notes. In general, her yearly planning was aimed at setting a projected schedule of instruction for each subject, analyzing and rearranging curriculum materials, and establishing an overall structure for the coming school year within which other levels of planning and action would be carried out. This broad outline of what she would teach, and to a lesser extant, how she would teach it, emerged from the mental review of the past year's events, combined with the adjustment of the sequence and pace of teaching to accommodate new curriculum materials and new ideas consistent with her implicit theories of effective instruction. A description is given of her methods for identifying problems and designing solutions and the somewhat different approaches she took in planning for the three subjects. (JD)

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TRANSFORMING CURRICULUM IN MATHEMATICS, SCIENCE, AND WRITING: A CASE STUDY OF TEACHER YEARLY PLANNING

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Abstract

An experienced teacher of second grade participated in three two-hour yearly planning sessions, one each in mathematics, science, and writing. The teacher "thought aloud" as she planned, and two researchers present at these sessions took written notes.

The teacher's methods of yearly planning for mathematics, science, and writing are described and contrasted in terms of a process model of teacher planning. Planning for mathematics and science were more similar to one another than they were to yearly planning for writing. The nature of yearly planning and its possible role as a link between curriculum and instruction are discussed.

TRANSFORMING CURRICULUM IN MATHEMATICS, SCIENCE, AND WRITING: A CASE STUDY OF TEACHER YEARLY PLANNING[1]

Christopher M. Clark and Janis L. Elmore[2]

This study is part of a program of research on teacher planning that has been underway at the Michigan State University Institute for Research on Teaching since 1977. The overall purpose of this program is to describe the part that the mental lives of teachers play in moving from thought to action and in transforming curriculum into instruction. The research has been guided by two models of teacher planning proposed by Robert J. Yinger (1980). Yinger's process model of teacher planning describes the psychological processes that teachers theoretically draw upon to create plans for instruction. Yinger's structural model of teacher planning hypothesizes that teachers do several different types of planning: yearly, term, unit, weekly, daily, and lesson planning. This study is a description of one second-grade teacher's yearly planning in three subject matter areas: mathematics, science, and writing.

The summer months are thought to be a time of relative inactivity for elementary-school teachers. Teachers enroll in university courses, take well-earned vacations, and often work at part-time jobs unrelated to the teaching profession. Researchers also behave as though the

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summer months are a relatively uninteresting and unprofitable time to do research on teaching. These months are often devoted to data analysis and write-up of information collected during the regular school year. However, in our program of research on teacher planning, it has occurred to us that, while most elementary-school teachers are not working in classrooms during the summer, some important events take place at that time that shape and affect their planning and instruction for the coming academic year. Yearly planning is one of these events.

Method

Research on teacher thinking has been investigated through the use of stimulated recall, interviews, protocol analysis, and think-aloud procedures, to name a few. The think aloud procedure, used successfully in earlier research on teacher planning (e.g., Peterson, Marx, and Clark, 1978), was selected for use in this study. The think aloud method has also been used to study the decision making processes of bank trust officers (Clarkson, 1962), chess players (de Groot, 1965), clinical psychologists (Kleinmuntz, 1972), and physicians (Elstein, Kagan, Shulman, Jason, & Loupe, 1972). This method allows the teacher-planner more freedom than the traditional interview technique in which the researcher directs the flow of the information. It does not confine the researcher and teacher to discussion of past events as does the method of stimulated recall. In the thinking-aloud method, the teacher orally reports what he or she is thinking about while actually doing the task of interest. For this study the task was yearly planning, and the teacher talked aloud while planning her mathematics, science, and writing curricula for the coming year.

The Teacher

The teacher who participated in our study, Ms. McComb,[3] is a second-grade teacher with eight years of teaching experience. She teaches in a self-contained classroom, and has done so for her entire teaching career. Although Ms. McComb volunteered to participate in the study, she was compensated at a competitive hourly wage for the time she spent in planning sessions with the researchers.

Procedure

During the think-aloud sessions, Ms. McComb began her yearly planning for three subject matter areas: math, science, and writing. Once each week for three weeks, she came to the College of Education building prepared to do yearly planning in one subject matter or aspect of the curriculum. The teacher met with two researchers and, for approximately two hours, engaged in a think-aloud planning session. She was encouraged to make all of her thoughts and deliberations audible to the researchers, and each session was recorded both in the form of written notes by the researchers and on audio tape. The researchers occasionally asked questions for clarification purposes, but the primary mode of activity involved the teacher planning aloud as though the researchers were not present.

Analysis

We describe this case of yearly planning in terms of the process model of teacher planning proposed by Yinger (1980). In this process model, Yinger describes three stages: (a) the problem-finding stage, (b) the design stage, and (c) the implementation, evaluation, and

[3] A pseudonym

routinization stage.

The problem-finding stage of teacher planning involves a cyclical interaction among teacher experience and knowledge, the teacher's goal conceptions, the materials available for use, and the reasons that prompted the teacher to plan (the planning dilemma). The product of the problem-finding stage of teacher planning is an initial problem conception, that is, a definition in the mind of the teacher of the task at hand. The design stage of teacher planning consists of a second cyclical process in which the initial problem conception is successively elaborated, investigated, and adapted until a provisional solution (a viable plan) is achieved. Because the yearly planning of the teacher in this study had not yet been tried out in the classroom, or carried to a finer level of detail such as term planning or unit planning, our descriptions are primarily of the problem-finding and design stages, and stop short of the implementation, evaluation, and routinization stage.

After each planning session the researchers met to review the think-aloud planning that the teacher had done and to begin data analysis. The data included audio tapes of teacher speech and notes on teacher behavior during the planning sessions. Teacher statements and observed behavior were sorted into three categories: (1) problem-finding statements and behavior, (2) design statements and behavior, and (3) explanation and justification statements and behavior.

For each session with the teacher, a chronological narrative was written that described the teacher's sequence of planning behavior, the issues and concerns raised during each phase of the planning process, and the teacher's explanations and justifications for her curriculum transformation decisions. Finally, the three session descrip-

tions were compared and contrasted to produce a list of distinctive features of the generic process of yearly planning, and to generate hypotheses about the relationships between the process of yearly planning and (1) teacher curriculum-specific experience, (2) the form of curriculum materials, and (3) the teacher's implicit theory of effective instruction.

Results

Planning for Mathematics Teaching

The first subject matter that Ms. McComb dealt with in her yearly planning was mathematics. The previous academic year was the first time that she had used the Developmental Mathematics Project (DMP) mathematics curriculum. Mathematics is one of the most highly valued parts of the curriculum for this teacher, and, on the whole, she very much liked this new curriculum, which makes extensive use of concrete manipulable materials and provides the teacher with very elaborate and specific instructions about what to teach and how to teach it. The problem-finding stage of Ms. McComb's yearly planning involved talking and thinking about successes and failures with this curriculum during the past year. These successes and failures can be categorized primari as teacher knowledge and experience factors, including the following:

--The class did not finish the entire set of units prescribed for second grade.

--The sequence of topics did not seem to make the best of sense.

--The students were sometimes unmotivated.

--The teacher experienced problems with how to manage the time of students who finished a particular unit or activity before the rest of the class.

--The teacher experienced a management problem with slow learners, especially those who had trouble with reading the instructions for problems.

--The teacher felt that the most productive times of the year (prime time) were not well matched with the most important units or topics in math.

In addition to these knowledge and experience factors, the teacher had some clear values or goal conceptions about math that figured in this problem-finding stage. Mathematics is an important subject matter for this teacher, in that she herself enjoys math and believes that many elementary-school students are unnecessarily turned off or intimidated by mathematics and that all of their subsequent experience with math is adversely affected. At a more detailed level, the teacher had some clearly expressed ideas about which topics or units within the DMP curriculum were most vital for students to learn well. A final goal conception that seemed to play a role in the problem-finding stage was that the teacher felt pressure to complete all of the units that the curriculum developers identified as appropriate for second graders. During the past year, the class completed nine of the 13 units or topics provided by the curriculum. For the coming year, the teacher was determined to try to be more efficient and successful at completing all or almost all of the 13 available units.

In the case of yearly planning for math, the teacher's initial problem conception seemed to have four parts: (1) a revised sequence of math units, (2) a schedule for teaching the math units, (3) the task of selecting or rejecting topics if there was not sufficient time to cover all of them, and (4) a process of fine-tuning or adjusting the mode of instruction and other aspects of teaching within each unit. Taken together, this problem conception answers the question, "What is necessary to solve my planning dilemma?"

The Des_ . Phase

After coming up with the initial problem conception, the teacher proceeded through a cyclical process of practical problem-solving.

Step one of the cycle was to list each of the math unit topics and to refer to her roll book, the teacher curriculum guides for each unit, and a calendar to determine the length of time devoted to each unit during the past year and the sequence in which they were addressed. The resulting list of topics, duration, and sequence information was then used in conjunction with each of the teacher guides in the second step of the cycle. The second step involved the teacher doing a mental review of each topic taught during the past year. This mental review addressed the content of each unit, the duration of each unit, the reasons why it was as long or as short as it was, the method of instruction used for each unit, and the remembered outcomes of each unit in terms of student mastery and teacher satisfaction with the process. Also considered in this mental review was the relationship between each unit and the topics that immediately preceded and followed it. Finally, the value or importance of this unit as a part of the mathematics experience of a second grader was addressed.

Parallel to this mental review of each topic, the teacher began to make decisions about the sequence of units and the duration of each for the coming year. Sequencing and scheduling were two important aspects of the teacher's initial problem conception. The teacher recorded her sequencing and duration decisions by annotating the list of topics made earlier in the design stage with a priority number and a note about the length of time to allocate to each topic. The sequencing and duration decisions seemed to be based on the teacher's memory of how these lessons had proceeded during the previous year. For example, Ms. McComb decided to change the sequence of the first three DMP math units during the year. She planned this change in order to provide some relief for the students from the heavy use of numbers, which was

the emphasis of Units 1, 2, and 3. In her new plan, Unit 3 was scheduled for late in the year and replaced by Unit 28, a "fun" unit on measurement using water in variously sized and shaped containers.

Duration decisions were less well specified than sequencing decisions. The teacher's general way of dealing with duration was to express the feeling that she would be more efficient the second time through the curriculum and therefore be able to cover the same material in less time than in the past year. Also, the students whom she planned to teach during the coming year had been exposed to the first-grade version of the DMP curriculum, unlike their predecessors. The teacher thought that this prior experience with a lower level of the curriculum would help move them all through the units at a faster pace.

Another consideration that arose with regard to sequencing and duration decisions had to do with the best times of the year for productive instruction, an idea that we call "prime time." A significant change in the sequence of units for the coming year involved rescheduling for the months of February and March two units that the teacher identified as the most important ones for second graders to learn well. During the previous year, these units were taught in May and June, and the teacher felt that the students were too distracted by the events of spring, the end of the year, and so on to get the most out of these important activities.

A third process that also proceeded in parallel with the mental review of each topic and the sequencing and duration decisions was a fine tuning of the instructional methods and other aspects of the teaching of each unit. These ideas and decisions did not seem to be a primary focus of the design stage of yearly planning, but seemed to occur serendipitously as a by-product of mental review. Some examples of fine

tuning include the use of whole group instruction instead of independent instruction for some units, the integration of one math unit into the science curriculum, the use of additional college-student aides for helping slow readers through the math curriculum, and the use of optional activities suggested in the teacher's guide by students who finish their daily work early.

The product of the design stage of yearly planning, in Yinger's terms, is a provisional solution to the planning dilemma. Ms. McComb's provisional solution consisted of a list of mathematics topics in a new sequence, annotated with information about allocated time (duration), and a few notes on the topic of fine tuning of instructional methods, integration with other subject matters, and the like. She indicated that this listing of topics and sequence and duration was a very satisfactory and complete product of a yearly planning session, and that it would constitute all that she really needed to get off to a good start in the teaching of math for the coming year. Although the researchers suggested the possibility of displaying this product or plan in a more graphic form, perhaps using a calendar format, the teacher said that she did not feel this would be particularly necessary or useful, in that she did not like to express her plans in the form of graphic representations.

Reflections on Yearly Planning for Math

It seemed to us that McMcComb was somewhat constrained in her yearly planning by the content of the curriculum itself. Although she felt free to express her own implicit theory about the relative importance of topics or units within the curriculum, she did not, at first, step outside the boundaries of the DMP curriculum to evaluate the

extent to which the various units and topics fit her macro-level conception of mathematics for second graders. Likewise, the teacher did not feel free to tinker with the activities or micro-level content within each unit. Her experience of the past year indicated to her that the curriculum was written in such a way that changing the sequence or omitting activities within a unit would probably lead to difficulties farther down the line (i.e., within that same unit) and so the units were treated as intact and indivisible building blocks.

We did get some hint of Ms. McComb's macro-level theory of second-grade math when she talked briefly about supplementing the DMP curriculum with "math-folder" work and special units that she herself would create. The math-folder work was largely computation practice and drill, which she believed were inadequately addressed within the DMP curriculum, and the supplementary units that she mentioned were one on telling time and another on counting and making change with coins and paper money. This suggests to us that Ms. McComb did have an implicit notion of what second-grade math should look like and did not feel constrained to limit math instruction to only what was provided by the DMP curriculum. Yet, the fact remains that during this planning session, she seemed to define the task as one of adapting the DMP curriculum in the light of last year's experience to fit her values, teaching style, management difficulties, student needs, and school calendar.

It was also interesting to observe the cyclical or parallel processing that went on during the mental review of each unit taught during the previous year. The teacher seemed to vividly recall how each unit went and particularly the problems encountered and the reasons for those problems. She seemed literally to be reliving this storehouse

of experience and, in the process, getting ideas for how to do things differently, more efficiently, and more satisfactorily in the next year. Ideas for fine tuning of the instructional process and for changing the sequence and duration of topics seemed to spring out of the mental review and reflection process. The most dramatic example of this was the idea to teach one of the math units as part of the science curriculum--an idea that had never occurred to her before, and an idea that reflected a degree of integration that was not typical of other parts of her curriculum.

Yearly Planning for Science Teaching

Ms. McComb's yearly planning for science teaching involved examining a new edition of the Science Curriculum Improvement Study (SCIS) that the district had purchased. She had taught SCIS for three years and was quite familiar with and enthusiastic about the curriculum. The new edition of SCIS used the same model of instruction as the earlier edition, but had a number of new features that the teacher had not encountered before. During the yearly planning session, she examined the teacher's guide for this new curriculum for the first time.

For the second grade, the SCIS is divided into two major sections or "kits," one entitled Life Cycles and the other entitled Interactions and Systems. At the school at which Ms. McComb works, only one set of the student materials, experiments, apparatus, and so on, is available. It is shared by two second-grade teachers, who have agreed to alternate the sequence in which the two major parts of the curriculum are taught. For the coming year, it will be Ms. McComb's turn to teach Life Cycles during the fall semester and to begin teaching Interactions and Systems

after the Christmas holiday.[4]

Problem Finding Stage

For Ms. McComb, the problem-finding stage of yearly planning for the teaching of science was relatively short. At the beginning of the session she seemed to have defined the problem as one of reviewing the teacher's guide for the revised curriculum to determine the extent to which new and different activities, materials, and procedures had been added to the earlier version of SCIS with which she was familiar. Further, she had decided to deal with only half of the curriculum. namely, the Life Cycles part, thus treating the science curriculum as two separate curricula. In part, this was due to the independence of these two halves of the SCIS package and in part it was due to the

[4] It is interesting to note two things here. First, the influence of an external and economic reality, namely, having only one curriculum package to share, on the sequence of instruction and on teacher planning. The second factor of interest is that, in an earlier interview, Ms. McComb talked about the instructional implications of the sequence in which these two major science topics were addressed. She reported that, because the Interactions and Systems topic and activities required a considerable amount of writing of reports and descriptions by her second grade students, that there was something to be said for teaching that kit in the second semester, after her students had gained a reasonable amount of proficiency in writing. In contrast, there were advantages to teaching the Life Cycles unit in the winter and spring, because many of the phenomena that are embodied in the curriculum also become visible in the world outside the classroom as spring proceeds. An additional practical consideration mentioned during the yearly planning session was that the Life Cycles activities often required ordering shipments of live materials that must be carefully cared for if they are to survive. The fall term with its many holidays and early weeks devoted to getting the classroom social system started provides more scheduling difficulties for integrating the live shipments into the curriculum and requires more planning attention to the timing of the arrival of these shipments so that, for example, they do not arrive at the beginning of a holiday weekend when they cannot be properly cared for over several days. A third problem with teaching the Life Cycles unit in the fall is that, as cold weather sets in, it is difficult to grow plants in the classroom, especially when the school building heating system is turned off over the weekend.

fact that Ms. McComb would be sharing the kit and materials with another second-grade teacher and would have access to only the Life Cycles materials until the end of the fall semester. Therefore, the planning session we report here has the characteristics of both term planning and yearly planning combined.

The only material that Ms. McComb used in this planning session was the teacher's guide for the Life Cycles section of the SCIS. She had already looked through the kit and student materials for this part of the curriculum at school to get an idea of what might be new and what parts of the curriculum were carried over from the previous edition. She began planning by examining the teacher's guide, skimming over parts of the guide that appeared to be identical to the earlier edition, and spending more time in detailed reading and interpretation of parts of the guide that dealt with new activities or materials. She confirmed that the discovery mode of learning and instruction was still the mode to be used for this new edition of the curriculum and spent the majority of her planning time figuring out how new components such as a set of "experience cards" and a new student manual were intended to be used by the curriculum developers. That is, a subordinate part of the problem-finding or definition of the problem for yearly planning was a kind of self-administered inservice training in which Ms. McComb had implicitly accepted the expertise of the curriculum developers and taken on the task of implementing this new curriculum as they intended it to be taught.

The Design Stage

After skimming the entire teacher's manual and noting the obviously new and different features of the revised curriculum, Ms. McComb shifted

to the design stage of the planning process. In addition to analysis and understanding of the new features of this curriculum, a second consideration during the design stage was scheduling. The teacher's guide provides a graphic display of a semester schedule, indicating the sequence of chapters and activities and a timetable for ordering live shipments with sufficient lead time to be coordinated with instruction. The teacher examined this schedule and noted that the 17 weeks portrayed in the schedule was quite compatible with her 20-week semester. She also noted that there were six live shipments available in the revised curriculum compared with three in the earlier version, although the six live shipments were grouped for ordering purposes into three packages of two. It was at this stage of the design process that she discussed some of the actual and potential problems of doing the Life Cycles part of the curriculum in the fall (holidays, the early part part of September being devoted to getting started, and the cold weather and heat turned off in the school building over the weekend making it difficult to grow plants).

After scheduling considerations were addressed briefly, Ms. McComb began a fairly close reading of the first chapters in the teacher's guide that dealt with actual classroom activities. She seemed to be mentally contrasting the activities performed during the past year under the old curriculum with the activities described in the new guide. She particularly liked the comprehensiveness of the new curriculum and the fact that it seemed to be much more systematically related to the science experiences of students in first grade. The first chapter began with a review of terms and concepts that bear on the Life Cycles unit that first-grade SCIS students had been exposed to during the previous year.

As Ms. McComb examined each of the chapters in some detail she expressed considerable enthusiasm for the new curriculum. She stated that she had always enjoyed teaching SCIS, and that the new version seemed to be a lot more thorough, with more variety in the student activities than in the earlier version. She also reported that she had begun to feel a bit stale and bored with teaching the earlier version of SCIS and was ready for a change to make it more interesting for her. This comment was interesting to us in that it speaks to the question of psychic rewards for teachers as a potential reason for or explanation of teacher planning and the desire for curriculum change. In this case, Ms. McComb had taught the old version of SCIS for three years consecutively. Much of the surprise and challenge had gone out of this teaching for her. The new curriculum, with its more elaborate activities and supporting materials was, in a way, like a new toy for the teacher that provided an opportunity for her to be more enthusiastic and interested in science education.

As Ms. McComb continued in the design stage of the planning process, she spontaneously drew a contrast between planning for science instruction and planning for mathematics instruction. She pointed out that science instruction was different than math in that it had never been a problem in the past to finish the entire science curriculum, whereas, with mathematics, the main challenge for yearly planning was to schedule carefully so that all of the intended material could be covered. Another difference between planning for science and for math was that the teacher reported letting her students work longer on a science topic or activity that they really got interested in, but this kind of flexibility in response to student interest was never mentioned as a planning consideration when dealing with mathematics. Finally she

characterized her planning for science instruction during the school year as being more a matter of weekly planning and scheduling, whereas she seemed to believe that yearly or at least term planning was the most important kind of preparation for math instruction.

In her first pass through the teacher's guide during the problem-finding stage, Ms. McComb noted that a new set of materials called "experience cards" was part of the revised curriculum. At that time she did not discuss how these cards would be used. Later, during her close reading of Chapter 1 of the teacher's guide, Ms. McComb identified the experience cards as a sub-problem in the design stage of yearly planning. She spent considerable time figuring out how the curriculum developers intended that the cards be used, and on making decisions about how she would include these experience cards in her own classroom organization. She tentatively decided to set up a table in her classroom as a learning center for using these cards. She considered the alternatives of making the cards optional for students or of devoting an entire science period to having all students work on the cards. In the first case of making the cards optional, she had some concern about whether her second-grade students would be ready to work independently at the beginning of the school year, especially if these cards required reading and interpretation by the student. Considering the second alternative, she described the possibility of devoting a science period to work on the experience cards, during which she would demonstrate the activities and procedures to the entire class and then allow the students to work individually on the designated activities. Rather than make a final decision at this point in yearly planning, Ms. McComb decided that she would experiment during

the fall term, using what she called a "trial and error process" to determine how best to manage the experience cards. At the same time, she indicated that the experience cards seemed to contain interesting and fun activities that were well correlated with the content of the chapter.

In finishing her reading and analysis of Chapter 1, Ms. McComb returned to the question of time and scheduling briefly by noting that it would probably take at least two weeks for her class to complete all of the activities in Chapter 1, which was a longer period than she would have devoted to these activities during the past year with the earlier version of the curriculum. At this point in her planning, she also indicated that she had a sufficient grasp of how the new curriculum was different from the previous version. She said that her planning would continue in the same pattern that characterized her analysis of Chapter 1, namely, a relatively close reading of the activities and their supporting materials. As with the math curriculum, we got the impression that much of the detailed planning for instruction in science had been delegated to the curriculum developers and that Ms. McComb's planning problem was more a matter of figuring out their intentions and learning how to execute the recommended procedures than it was a matter of modifying, supplementing, or elaborating the curriculum.

At this point in the process, when the teacher seemed to be finished with yearly planning, the researcher raised the question of how the teacher would handle the fact that the revised curriculum seemed to demand more class time than the previous version did. The teacher responded that she would probably schedule longer science periods or more of them during any given week and that a policy change

at her school for the coming year would help to provide more time for instruction and would make planning easier for her. This policy change was the principal's decision that there would be no school-wide scheduled recess during the day. The timing and duration of recess would be left to each teacher, and Ms. McComb intended to have recess less frequently and to schedule it for times when it would not interfere or otherwise constrain an instructional activity in progress. She did not mention or seem to consider the option of teaching less than the full science curriculum as presented in the teacher's guide. This seemed to be because of her enthusiasm about the teaching of science, the novelty of this new curriculum, and also because of the polished and comprehensive structure and attractive packaging of the new curriculum. The new curriculum was presented as a kind of seamless garment that did not encourage subdivision or rearrangement of its parts. The only component of the new curriculum that seemed to be optional was the experience cards, and the teacher seemed to find these so attractive that she wanted to use all of them.

In predicting how her subsequent planning for the teaching of science would proceed, the teacher said that she did not intend to read the entire teacher's guide for the Life Cycles part of the curriculum during the summer. Rather, she felt that she had a sufficiently comprehensive grasp of the new curriculum to get off to a good start in the fall and that she could read about each chapter and its activities a couple of weeks in advance of teaching them more profitably than to try to read, understand, and prepare for the entire term in one or two sittings. One of the reasons that Ms. McComb gave for planning in this way was that she might get confused by all of the details of several different chapters coming at her at once. A second

reason given was that it seemed more fun and exciting to her to discover what was going to happen next gradually rather than at a single sitting. Likewise, she reported that her term planning for winter and spring semester on the Interactions and Systems part of the curriculum would probably be done over the Christmas holidays. She felt that this part of the curriculum would be so similar to the Life Cycles part that there would be a great deal of transfer from her planning and instructional experience in the fall to her planning and instruction in the winter and spring. Finally, Ms. McComb reported that there was an inservice workshop in the revised version of the curriculum schedule for early fall. This inservice workshop was scheduled by the school principal, who is the chairperson of the district SCIS curriculum committee. Note that there is presumably considerable support, both administrative and psychological, for planning for science instruction at this school and for making the implementation of the new curriculum a success. Ms. McComb reported that her principal previously had looked through the new curriculum materials and that they had at least one conversation about the similarities and differences between the old version and the new one.

Reflections on Yearly Planning for Science

The process of yearly planning for science instruction involved a relatively short problem-finding stage. It seemed that Ms. McComb had already identified an initial problem conception upon arrival, namely, to analyze the new curriculum teacher's guide for similarities to and differences from the curriculum guide that she had used during the previous year. The design stage of term planning involved two distinct kinds of activity: first, reviewing the general structure

of the revised curriculum and identifying components that were new and required understanding and unique preparation, and second, analyzing in more detail the content of each chapter and its subordinate activities. This content analysis also seemed to involve a process of visualizing how these activities would be organized and would operate in her classroom, along with a visual recall of how similar processes were organized and operated in her classroom during the past year. This process of visualization and comparison is illustrated most graphically by the events concerning the experience cards described above.

After the teacher had completed the design cycle twice (once for the total curriculum structure and once for the first chapter of the teacher's guide), she was satisfied that her major question or initial problem conception had been largely answered or solved. That is, she had confidence that she now knew enough about the differences between the revised curriculum and the old curriculum that she could carry out successful science instruction for the fall term. She had worked out a few of the details of classroom and activity management, and developed some tentative ideas about accommodating the additional time requirements of the new curriculum. The fall inservice workshop was seen as another opportunity to consider these issues and perhaps receive some expert advice on these matters. In short, she had reached the point of diminishing returns for yearly planning and was ready to set these materials and considerations aside until much closer to the beginning of school.

Yearly Planning for Writing

At the time of this study Ms. McComb's school district was preparing to implement a new writing curriculum for grades kindergarten

through 12. This curriculum was called the "Common Writings," and was locally created by a committee of district teachers working together for about one year. The committee had representatives from each grade level and was chaired by the high school principal, a former English teacher. The Common Writings curriculum was distributed to all teachers during the Fall of 1978. At that time, a half-day inservice introduction to the curriculum was conducted, and all of the teachers were encouraged to familiarize themselves with the Common Writings and to try out the curriculum voluntarily during the current school year.

Problem-finding stage. In planning for writing instruction for the coming year, Ms. McComb spent very little time in the problem-finding stage. It seemed as though the planning task itself was obvious to her and already well defined at the beginning of the planning session. Our impression of her definition of the planning task task was that it involved three parts:

1. to examine the Common Writings curriculum and identify which of the suggested activities in this curriculum were already part of her own usual writing instruction plan,
2. to review the successes of the past school year in the area of writing, and
3. to slightly elaborate a new idea for creating a writing center in the classroom.

The design stage. In the process of yearly planning for writing, Ms. McComb read each of the activity descriptions as a kind of stimulus for recollecting and describing what kinds of writing activities she had engaged in with her students during the previous year. She formed and strengthened her opinion from this review that the Common Writings listed for second grade were much too modest and few in number. She pointed out that many of the activities earmarked for third and fourth and even fifth graders were of the type that she and her second-grade

students had done during the past year.

In addition to producing and developing a characterization of the Common Writings curriculum, the mental review of the activities of the previous year seemed gradually to give Ms. McComb positive feelings about how successful the teaching of writing had been in her classroom. She became quite enthusiastic about what an excellent group of students she had had and how effectively and enthusiastically they took to the many writing tasks that she had led them through.

The design stage was complete when Ms. McComb had looked through each of the activity descriptions in the Common Writings curriculum and had compared them to what she had done during the previous year. Somewhat to our surprise, the provisional solution to her planning dilemma was to try to do almost exactly what she had done during the previous year. Her reasoning seemed to be that since she judged the previous year to have been very successful in the teaching of writing, and since the activities that she and her students had engaged in far exceeded in number and level of sophistication the activities described in the Common Writings curriculum, that to repeat the activities of the previous year would be more than sufficient. She characterized the Common Writings curriculum as possibly useful for a beginning teacher who had no ideas or experience in the teaching of writing, but quite inadequate for guiding an experienced teacher like herself.

The only uncertainty that Ms. McComb referred to in planning for writing concerned how rapidly and successfully her new students would take to the task of becoming writers. She described her last class as very talented and exceptional in this regard, and was uncertain about how comparable her students in the coming year would be to this

exceptional group. From this, we inferred that she had an implicit notion that ability in and enthusiasm for writing may be a talent or individual aptitude that is not particularly susceptible to instruction. If she is lucky enough to have another class that takes to writing quickly and cooperatively, then next year will be much like last year. If, in contrast, her students are not spontaneously interested in and gifted as writers, then some of the more challenging and demanding writing activities will have to be eliminated.

Reflections on Yearly Planning for Writing

As we have said elsewhere (Elmore, Note 1), writing is very different from other parts of the elementary-school curriculum. Unlike reading, math, social studies, and science, there are relatively few elaborate curriculum systems that support the teaching of writing. What materials do exist seem to be largely ad hoc collections of activities that lack a unifying theoretical or even structural organization. For these reasons, it is particularly interesting for us to observe the process of teacher planning in writing because much of the instruction that is planned must be invented by the teacher rather than borrowed from a curriculum or textbook author or publisher.

In Ms. McComb's case, we saw an example of a draft version of a locally-produced curriculum for writing being examined and evaluated by an experienced teacher. The result of this comparison was that the teacher felt her own ideas and experience in the teaching of writing were much more useful and complete than those presented as minimum standards in the Common Writings curriculum. Because Ms. McComb could document having done far more than the minimum set of activities described in the Common Writings curriculum, she tended to discount

its value to her and eventually decided to let her own experience be her guide in the teaching of writing for the coming year.

Another feature of interest in Ms. McComb's planning for writing instruction was that she considered herself to be an active and effective writer. She reported that she had written a short story and submitted it for publication and that she did a considerable amount of poetry and letter writing, all of which she enjoyed very much. It seemed to us that the elaborateness and success of her writing instruction in the past year was, at least in part, affected by this personal interest in the process of writing and by the teacher's own enthusiasm about being a good writer.

In describing the annual cycle in her writing curriculum, our teacher reported that the early part of the year was largely devoted to working with her students on writing complete sentences and on paragraph skills. She reported that her second graders needed a great deal of work on these skills during the first two months of school. Once these fundamentals were mastered, then the writing curriculum became a relatively independent series of activities in report and story writing. Many of these tasks were related to holidays during the year, others were integrated with the science, reading, and social studies curricula, and still others were special projects such as the autobiographical writing involved with the "Person of the Week" activity and the culminating activity of the year: the production of a book by each student.

Our impression of Ms. McComb's implicit theory about writing is that, once the mechanical prerequisites are mastered (printing, sentences, and paragraphs), that the most important thing for students to do is to have a relatively large number of opportunities to write.

The nature and variety of these writing tasks did not seem to be a subject of concern for Ms. McComb. This implied that practice or experience with writing is the best teacher. There was relatively little emphasis, during the yearly planning session, on how writing would be taught, or on the process of writing itself. This may be an artifact of the way in which the yearly planning session was conducted, but it may also reflect an interesting difference between writing as a topic of instruction and, say, science or math.

Another difference between planning for writing and planning for math or science was that Ms. McComb did not seem very concerned with being able to fit in all of the topics and activities in writing during the year. In other words, the question of scheduling and sequence did not come up as an important topic for yearly planning in writing instruction. Scheduling and sequencing were central concerns in Ms. McComb's yearly planning for science and math. Again, this may reflect the difference in detail and extensiveness of the curricular materials and associated activities available in these three subject matter areas. But it may also reflect the idea that doing two or three fewer writing activities during a given year would not leave her students with embarrassing gaps in their knowledge or experience. Math and science may be hierarchically structured with specifiable prerequisites for more advanced work in third grade and beyond, but writing does not seem to be thought of in this manner.

In summary, Ms. McComb planned to try to duplicate a successful year of writing instruction. She examined and set aside the Common Writings curriculum as too modest for her purposes. She planned a two-stage writing curriculum in which the first stage involved direct instruction in writing complete sentences and paragraphs, and the second

stage involved an eclectic variety of activities that she had found to be successful in the past. Her criteria for successful activities included the idea that children's writing should be related to what is going on in their lives at the time (meaningfulness), and that they should learn to be systematic and painstaking as they produce their best work for final copy. She believed that learning to write is hard work, but that second-grade students are capable of it and that they can reap the benefits of being good writers if they apply themselves.

The Nature of Yearly Planning

Ms. McComb's three episodes of yearly planning have a number of elements in common. In general, it seems that her yearly planning was aimed at setting a projected schedule of instruction for each subject, analyzing and rearranging curriculum materials, and establishing an overall structure for the coming school year within which other levels of planning and action would be carried out. Ms. McComb's yearly planning for mathematics, science, and writing consisted largely of creating a synoptic picture of the coming year. This broad outline of what she would teach and, to a lesser extent, how she would teach it, emerged from a process of mental review of the events of the past year, combined with adjustment of the sequence and pace of teaching to accommodate new curriculum materials and new ideas consistent with her implicit theory of effective instruction. Yearly planning was a time for making the "big decisions," and was not a time for getting bogged down in day-to-day details.

Ms. McComb's yearly planning in the three different curricular areas provides some interesting contrasts. The mathematics curriculum materials and the science curriculum materials were similar to one

another in that they were both elaborate commercially-produced systems. Ms. McComb had one full year of experience teaching the math curriculum and had taught an earlier version of the science curriculum for three years. In both cases, it seemed that she defined her major task in yearly planning as one of rearranging the sequence of units within the curriculum to fit her experience and priorities. In neither case did she change the content or structure of student activity within a unit. In the case of yearly planning for mathematics, we have evidence that she used the first year of teaching a new curriculum as a kind of pilot test that served as the basis for curriculum revision and adaptation. In the case of science, Ms. McComb's yearly planning was more focused on how the new edition of the curriculum was different from the earlier version with which she was both familiar and satisfied.

Yearly planning for writing instruction differed from planning for the other two subject matters in a number of ways. The new Common Writings curriculum was neither polished nor elaborate. The credibility of the authors of the Common Writings curriculum was not well established. And the Common Writings curriculum was offered merely as a set of ideas for minimum performance in writing at each grade level. All of these factors changed the task of yearly planning for writing instruction to one of deciding whether or not to use the Common Writings at all rather than one of how to use the Common Writings curriculum. In the end, Ms. McComb decided that the teaching of writing that she had done during the past year was much more elaborate and satisfactory than the the list of minimum activities offered by the Common Writings curriculum. In short, the Common Writings curriculum had been judged and found wanting. By default, yearly planning for writing instruction consisted of

reaffirming her intention to teach in the same way that she had during the previous year.

In yearly planning, Ms. McComb's curriculum transformation decisions were concerned with time allocation, sequencing units, identifying similarities and differences between new and old curricula, and supplementing published curricula by adding additional content. The primary resources that she brought to bear in yearly planning were the curriculum materials themselves (especially the teachers' guide), her own memory of classroom interaction during the previous year, and a calendar for the coming academic year. In rationalizing her planning decisions, Ms. McComb appealed to her own beliefs and values about the relative importance of subject matters, the typical abilities of second-grade students, and what she knew about the prior experiences of her incoming class (e.g., the facts that they will have been exposed to the first-grade version of the DMP math and SCIS science). She stopped yearly planning in a given subject area after achieving a general understanding of the curriculum materials and their components, and after she had confirmed that she could "cover the material" in the time available to her.

In one sense, the curriculum transformations that Ms. McComb made in her yearly planning for mathematics, science, and writing may seem trivial. The content and activities of the math and science curricula remained intact, and she judged that the Common Writings would be subsumed by her own pre-existing writing curriculum. But, in another sense, Ms. McComb's curriculum transformations were of great significance. By carefully examining, evaluating, and fine tuning (or rejecting) each set of curricular materials and, at the same time, reflecting on the events of her most recent year of teaching, Ms. McComb established

a sense of ownership over the curricula (Ben-Peretz, 1975). She transformed them from "theirs" to "mine," and prepared herself and her materials for the next stages in the planning-action process. The few visible changes in topic sequence, unit duration, and instructional mode that she did make were changes needed to adapt these curricula to the unique needs and circumstances of this particular teacher, classroom, and school. Yearly planning served to satisfy Ms. McComb that she had what she needed to provide conditions for learning at least equal to those that she had provided during the previous year. In an important way, her yearly planning decreased the uncertainty and unpredictability that attends every teaching situation.

Conclusion

This description of three episodes of yearly planning by a single teacher is a modest beginning for curriculum theorists, researchers on teaching, and teacher educators who wish to understand the relationship between curriculum and instruction. Teacher yearly planning clearly plays an important role in this relationship, and it may constitute the first step in the process of bringing academic content to life in the classroom. More research is indicated on the variety of ways that teachers accomplish yearly planning, on the role it plays in relation to other types of planning, and on the potential effects of training both prospective and experienced teachers in alternative approaches to yearly planning.

Reference Notes

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