The rational powers of the human mind ... are central to individual dignity, human progress, and national survival (6).

FUNDAMENTAL to man's humanness and effectiveness is the development of his rational powers. Traditionally the school, as an agent of society, has accepted the development of these powers as one of its key functions. To supervisors has fallen the task of mediating between teachers and society's goals.

Conscientious supervisors are aware of current trends in thinking. At the present time, however, resources to assist supervisors in working with teachers in developing rational processes are somewhat scant. With this dearth of resources in mind, the intent of the writers of this article is to assist the supervisor who wishes to work in more detail on developing the cognitive skills.

One basic assumption permeates this article. A relationship is suggested between a teacher's awareness and awakening of his own thought processes and the comparative attention he gives to the development of such processes in students.

One Conception of Thinking

Building upon this assumption the writers have attempted to do the following: (a) to describe briefly thought processes as commonly discussed in the literature, and (b) to sketch a program for supervisors desiring to help teachers improve their thinking skills.

Thinking \(^1\) has been described as a process that has a beginning point and an end product. What comes between these points is speculative. Bartlett states, "The process moves from the start to its finish with a kind of necessity" (2). Russell says, "Thinking is a process rather than a fixed state. It involves a sequence of ideas moving from some beginning, through some sort of pattern of relationships, to some goal or conclusion" (10).

In discussing what transpires when a person thinks, psychologists and edu-
icators agree that thinking can take many forms. Following are nine thinking processes and brief descriptions of each.

Perceiving is the act of noticing or selecting stimuli from the individual's total environment. The process may operate at different levels moving from seeing only the obvious to seeing the unusual as well as the obvious.

Imagining involves the ability to invent new or original ideas. These ideas may not necessarily be new to the outside world but are new to the individual and are characterized by freshness and newness.

Analyzing is concerned with taking apart the elements of a situation and studying the singular parts.

Patterning is the process of putting together elements of a situation that have some relation to each other. The process may operate at different levels, moving from simple classification of items into categories to a totally new complex of ideas at a foundational level.

Redefining involves the finding of new or uncommon uses for a given idea or object. Flexibility is inherent in the process.

Predicting involves projecting ideas. The process can move in a logical pattern from known facts to probable outcomes, or it can involve a creative leap beyond known facts.

Judging is the process of weighing evidence and forming opinions. Depending upon the nature of what is to be evaluated, the individual bases his judgments on a collection of data, intuitive insights, or a combination of both.

Developing fluency involves the ability to express many ideas in rapid succession without immediate consideration of the worth of each idea. This process is associated with freedom, looseness, and flow of thought.

Elaborating involves embroidering or restating the old. Newness is not as essential here as refinement, clarification, and extension of a previously formulated concept.

Improving Thinking Skills

One means by which a supervisor might work with teachers both individually and in groups is through a workshop designed to help teachers develop their thinking processes during their planning for teaching. Planning involves the pre-thinking prior to what transpires in the classroom. What actually happens during the lesson is a combination of the pre-thinking plus the on-the-spot thinking that the teacher does. For this workshop we are concerned only with the pre-thinking. Elements concerning the organization of a workshop such as timing, items related to credit or non-credit, membership, and facilities are not central to this article and, therefore, are not included in the discussion.

The crux of the workshop is the awakening of the teacher's awareness of his ability (a) to develop his thinking behaviors and (b) to expand his thought processes used in planning. The supervisor assists the teacher in the introductory stage of the workshop through the use of a planned interview designed to make an impact on the teacher concerning the status of his own thinking behavior. Prior to the interview the teacher plans a lesson that will be used as the focal point during the interview. A tape recording is made of the entire interview so that future use can be made of the teacher's responses. The questions in the Interview Guide are used in order to elicit responses about the nine thinking processes described earlier.
Interview Guide

Perceiving
— What observations prompted you to plan this lesson?
— Describe vividly several characteristics of your classroom.

Imagining
— What exciting ideas for new materials, methods or resources did you consider while planning this lesson?
— What was the most important idea new to you in this lesson?

Analyzing
— What did you consider that might influence the direction of the lesson?
— What factors made a difference in this lesson?

Patterning
— What means did you use to bring about an understanding of the relationship between the various parts of the lesson?
— How did you plan to relate this lesson to previous and future lessons?

Redefining
— What alternatives did you consider for use if the plans were unsuccessful?
— What materials, methods or resources did you use in a new or different way?

Predicting
— What did you plan as possible outcomes of this lesson?

Judging
— How did you decide what changes could be brought about through this lesson?
— What criteria did you use to determine that your plan was complete and that your purposes could be accomplished?

Developing Fluency
— What sources would you suggest for a teacher to get help in planning a lesson?
— How many alternative ways can you list for developing the lesson?

Elaborating
— If you had the time, how would you further develop this lesson?

— If you taught a similar lesson before, how does this plan differ?

Individual Focus on Thinking

After the teacher responds to the items on the Interview Guide, the teacher and supervisor listen to the recording in order to become aware of various modes of thinking used by the teacher. To assist in sharpened listening, the Inventory of Thinking Behaviors has been developed. The behaviors listed in this instrument parallel the thinking processes discussed earlier. A workable plan is to place checkmarks beside the behaviors listed in the instrument when responses from the interview refer to the behaviors. Key phrases from the responses might be jotted down on the instrument as a reminder of the behaviors.

After the listening experience, the supervisor might find the following instrument helpful in analyzing the conversation:

Inventory of Thinking Behaviors

Perceiving
— Describes the degree of rapport he has achieved with his students.
— States the academic, social and emotional needs of his students.

Imagining
— Shows originality and curiosity in the use of materials, methods and resources beyond those found in the classroom.
— Brings freshness and origination to the lesson plan.

Analyzing
— Looks at assignments individually in order to personalize the lesson.
— Shows evidence of having studied his students’ total background to find areas that are manageable, important and most open to change.
Patterning
— Regards this lesson as one part of his students’ total learning experiences.
  Provides opportunities for students to translate subject matter into meaningful patterns.
  — Prizes a lack of planned order when the concept of order is unnecessary.

Redefining
— Displays willingness to shift focus of the lesson at pupil suggestion.
  — Finds new and original uses for materials, methods and resources.

Predicting
— Projects possible outcomes from the lesson plan.
  — Considers possibilities for future lesson development from this plan.
  — Predicts changed behavior as a result of planning for change.

Judging
— Verbalizes criteria for selection of materials, methods and resources.
  — Compares and contrasts outcomes of the lesson with groups and individuals.
  — Uses information from more than one source.

Developing Fluency
— Gives many responses to open-ended questions.
  — Produces a variety of ideas for initiating and developing the lesson.

Elaborating
— Provides for refining ideas so that they are easily managed by pupils.
  — Establishes techniques for clarifying concepts that are difficult to understand.

Group Focus on Thinking

Both parties are now ready to move into a small group stage of the workshop. A few activities are suggested from which the supervisor can select those most appropriate to the members of his group. Activities can be centered around
  readings and discussions
  techniques and devices
  adaptations of instruments originally designed for studying the verbal behavior of teachers
  group analysis of planning processes
  preparation of cycles of goal-setting, experimentation, and analysis of outcomes
  extensions and modifications of the Inventory of Thinking Behaviors.

Elaboration on a few of these activities might suggest usable ideas for the reader.

Readings and Discussions

Selected readings by writers such as Bloom (3), Ennis (7), and Russell (10) in the area of critical thinking and those of Bruner (4), Getzels and Jackson (9), and Torrance (12) in the area of creative thinking are easily available and provide ideas that could generate discussions.

Techniques and Devices

A variety of techniques and devices can be used throughout the workshop to develop thinking skills. Some of these activities can be carried on throughout the workshop and others can serve a particular need at certain points. Supervisors may want to adapt some of the following suggestions.

Perceiving might be pointed up by the use of motion pictures. Films can be projected without sound, or films produced especially for developing perceptual skills (5) can be used. Both might be followed by discussions of what was perceived. To help teachers perceive more richly, they can be
invited to observe a street corner scene and jot down all the uncommon sights and sounds.

Analyzing can be further developed by the use of advertising techniques. Over a period of time, teachers' attention can be directed to advertising techniques employed on billboards, television, radio, magazines, and newspapers. Teachers can study copy for examples of slanted statements, poor logic, and half-truths.

Patterning can be encouraged by using games such as "Wiff 'N Proof" (1) in which the play of the game depends on following predetermined patterns. More open-ended types of patterning can be stimulated through the use of activities involving free-association. In one such activity each teacher is given four to six unrelated words on a slip of paper and asked to synthesize the words in any way he sees fit. Outcomes might include poems, drawings, stories, musical numbers, etc.

Predicting might be stimulated by the display of a sealed box of unknown contents. Teachers are informed of items in the room in which the box was packed; the box is weighed, and teachers are asked to guess the box's contents.

Other techniques can be adapted from games such as "Password" (word association) and mathematical puzzles, such as the "Magic Number Square," from creative uses of objects such as kaleidoscopes and photographs of cloud shapes, and from activities such as brainstorming.

Adaptations of Instruments

Instruments originally developed for describing the verbal behavior of teachers might be adapted for use in noting change in thinking behaviors. For example, adaptations might be made of Flanders' framework, which describes classroom interaction (8), and the "Stanford Teacher Competence Appraisal Guide" (11), which is designed to assess and improve levels of competence in teaching.

Group Analysis of Planning Processes

Members of the group can analyze in two ways procedures used in planning: (a) the procedures used by an individual in planning a lesson can be analyzed by the group; (b) processes used by the total group in planning a sample lesson can be analyzed.

Preparation of Planning Cycles

Group members can set up short-term cycles on planning during which they work on hunches about developing thinking behaviors—setting goals, experimenting with ideas, and analyzing the outcomes of the total experience. The cycles can be established by individuals or by the group.

Extensions of the Inventory

The Inventory of Thinking Behaviors was developed with the intent that it would be further refined and extended. Persons may elect to take a portion of the instrument, develop it further, test it out, and report any modifications or clarifications to the group. The instrument can also be used for a group analysis of one teacher's interview. With the teacher's agreement, the entire group can listen to the tape recording to note thinking behaviors. Information gleaned from the use of the instrument can be used to raise questions and stimulate discussion.

The workshop can be arranged so that comprehensive study is given to
thinking in general. Another way of organizing might be to study in detail two or three dimensions of thinking.

Continuous evaluation of group and individual progress might be an insighteful way of viewing personal growth. As teachers gain fuller understanding of the thinking processes and greater awareness of their own thinking behaviors, they may wish to extend their efforts by developing these processes through more personalized supervision. Teachers might consider ways in which they can assist pupils in developing their thinking behaviors. This theme and others might provide topics for future workshops that focus on education's role in developing man's rational processes.

The supervisor is in a key position to provide stimulation and setting for the teacher's self-improvement of his cognitive processes. In this way the supervisor also contributes indirectly to the enhancement of children's thinking. Teachers who are aware of and prize the development of rational powers within themselves are more apt to foster the thinking skills in children because what a person prizes and cherishes is often what he covets for others. Several suggestions have been made as to ways the supervisor can help teachers to use their thought processes more intelligently, particularly in planning for instruction.

The strength of this proposal resides not in assurance of a methodology which will elicit certain thinking skills in teachers. Rather the dynamics of the proposal reside in:

The questions it raises about how to teach teachers to utilize fully their thought processes;

The challenge it presents to the task of the supervisor; and,

The concern for the relationship of man's rational powers to other peculiarly human functions that the thoughtful reader will seek to understand . . .

References
