

Determining Cognitive Style by Systematic Observation

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The purpose of this paper is to familiarize educators and researchers with a method to develop curriculum according to the individual cognitive styles of individual students. The cognitive styles are ascertained by means of a systematic observation instrument developed and validated by this writer. The systematic observation instrument, AORO, measures the preferred way in which the student tunes into the world. This measurement is categorized as action- or reflection-oriented and is based on Jung's psychological study of extroverted and introverted types. Although many researchers have identified similar traits and have developed written diagnostic tests to determine cognitive style, AORO is the only systematic instrument designed to determine the preferred learning patterns of students.

Cet article a pour objet de faire connaître aux éducateurs et chercheurs une méthode permettant la réalisation de programmes d'études adaptés aux styles cognitifs de chaque étudiant. Un instrument servant à l'observation systématique des styles cognitifs fut élaboré et validé par l'auteur. Cette technique d'observation, AORO, mesure l'approche que privilégie l'étudiant pour capter le monde extérieur. Cet instrument de mesure élaboré à partir des études de Jung sur les types introvertis et extravertis classe les étudiants en deux catégories, ceux tournés vers l'action et ceux tournés vers la réflexion. Bien que de nombreux chercheurs aient identifié des traits identiques et mis au point certains tests "diagnostiques" de travaux écrits susceptibles d'identifier divers styles cognitifs, l'AORO demeure cependant le seul instrument d'observation systématique conçu pour déterminer les schémas d'apprentissage que préfèrent les étudiants.

Carl Jung, fascinated by the conflicts of psychoanalytical theories posed by Adler and Freud, examined each from the point of view of each man's personality. Freud, Jung claimed, approached psychoanalysis in terms of events external to himself. Adler, on the other hand, found the determining agency to be preeminently in the subject. And thus the world was introduced to its first extrovert and its first introvert, as Jung coined the terms in the typology theory which was to be his major contribution to psychology.

When Jung drew this intuitive distinction between the basic attitude or perceptual bent of extroverts and introverts, he did not publish his discovery, but reflected on it for several years. This prolonged inquiry led to his understanding that more than a basic type difference exists to differentiate and understand individuals, and that difference is psychological function, or mode of action. He saw this "compass" of the psyche to exist in four modes: Sensing or intuition and feeling or thinking. He insisted everyone uses all four modes, but prefers two, is more comfort-

able in them, and will become neurotic if not allowed to function in a way natural to him or her.

In an attempt to try to personalize education, to fit curriculum to suit the individual and natural needs and interests of each child, to take advantage of the child's strengths, to develop his weak area, in an attempt to allow the child to be a happy, functioning, independent learner, this author turned to the typology theories of Jung and their implications for education. Based on the research of Myers (1962), McCaulley (1974), Lawrence (1979), an observation instrument, **ACTION ORIENTED, REFLECTION ORIENTED (AORO)** was developed.¹ The main point behind the instrument is that we can expect children to develop and learn better in classrooms that take account of their natural bent toward action or reflection. The instrument is intended to be a practical means of making the personality factors defined by Jung a regular part of planning for teaching.

THEORETICAL BASIS

Too often teachers and educators of teachers claim in desperation and defeat that teaching is an art, and that the great teacher, i.e., one who is sensitive, perceptive, skilful, is born, not trained. The development of **AORO** and its use by teachers is an attempt to scientifically, systematically train teachers in empathy and in precise diagnostic, prescriptive methodology. As such, science teaches a sense of the art to the novice, and refines the technique of the successful teacher, already an artist.

The sources of educational science are any portions of ascertained knowledge that enter into the heart, head and hands of educators, and which, by entering in, render the performance of the educational function more enlightened, more humane, more truly educational than it was before. But there is no way to discover what is more truly education except by the continuation of the educational act itself. The discovery is never made; it is always making . . . in its very process it sets more problems to be further studied, which then react into the educative process to change it still further, and thus demand more thought, more science, and so on, in everlasting sequence. (Dewey, 1929, p. 76-77)

In 1978, the author developed an observation instrument, **Action-Oriented, Reflection-Oriented (AORO)**, to determine preferred patterns of learning in middle school children. The instrument directly involved teachers in a nonevaluative manner in looking at how each student prefers to perceive the world, either objectively or subjectively, and thereby understanding the learning preferences of each student. In turn, this understanding could become the basis on which to develop curriculum according to those preferences. Furthermore, its use sensitized the teacher to students' perceptions, making the teacher more aware, developing a new frame of reference which would become a natural part of his thinking and behavior.

Rosenshine and Furst (1973) warn educators to be wary of an observation system having no theoretical base. The theory behind the focus of AORO has its origin in the works of Jung and his discovery that

besides the many individual differences in human psychology there are also typical differences. Two types especially become clear to me; I have termed them the introverted and the extraverted type. When we consider the course of human life, we see how the fate of one individual is determined more by the objects of his interest, while in another it is determined more by his own inner self, by the subject. Since we all swerve rather towards one side or the other, we naturally tend to understand everything in terms of our own type. (June, 1971, p. 3)

This adds impetus to the notion that it is essential for the teacher to be aware of the student's preferred way of tuning into the world. In addition to the fact of students' having preferences, the teacher's own preferences hinder this understanding unless some specific means to understand a type different from his is afforded him. Jung warns that although one prizes his own typology, it is not natural to value or to understand the preferences of one whose dominant function is opposite to one's own.

In examining Jung's model of typology, it is important to see it as Jung did, as an archetypal model, a hypothesis by which you can find out things (Franz & Hillman, 1979). From this heuristic view can be seen the archetypal value of typology in explaining phenomena relating to personalities and learning style. It is wise, however, not to overexpand the model to the point that it dominates the understanding of the complexities of learning. Seen for what it is, one method of tuning into how students prefer to learn, it is useful to teachers and can be easily used by them.

The most extensive research on Jungian typology and its implications for education has been conducted by Myers-Briggs (1962). She developed the Myers-Briggs Type Indicator (MBTI), a 166-item forced choice test to indicate Jungian type preferences for four dichotomous dimensions: Extroversion-Introversion, Sensing-Intuition, Feeling-Thinking, and Judging-Perceiving. According to data gathered by Myers (1962), in a regular elementary classroom extroverted children outnumber introverted children three to one.

Other educators have used the theoretical notions of Jung in suggesting curriculum development. Lawrence (1979) has developed a training model for teachers, *People Types and Tiger Stripes*, which uses typology to identify student personality traits and to suggest learning situations which would strengthen their weaker processes.

McCauley and Natter (1974) prepared a report on "Psychological (Myers-Briggs) Type Differences in Education," in which they described research using the MBTI as an instrument for investigating the individual

differences in academic achievement, motivation, teaching and learning styles, as well as career development.

Guttinger (Note 1), in her study of factors which affect individualized reading instruction at the high school level, found that extroverted types showed a significant gain in posttest reading scores (Stanford Diagnostic) once activities favored by extroverts had been included in her program. Prior to the inclusion of these activities, gains by extroverted students had not been significant.

Although these treaties and research projects examined all aspects of Jungian typology, it was decided by this researcher to examine only extroversion and introversion. This decision was based on the fact that, according to Jung, extroversion and introversion are the most important preferences, affecting all other functions, and they are the most clearly visible. Moreover, the instrument was designed as a training tool for teachers. As such, it was felt that keeping the categories as simple and clear as possible would be most beneficial in giving the teacher a feeling of self-confidence and a belief that planning for individual differences is indeed possible. Many learning style inventories, such as the Learning Style Inventory (LSI) by Dunn and Dunn (1978), address so many factors that analysis and curriculum planning tend to be overwhelming. It was the intent of AORO to zero in on one major aspect of personality function and, through it, train teachers to be empathetic observers and competent curriculum planners. In this way teachers are encouraged to undertake the process of tuning into learning style, whatever form that learning style may take.

Extroversion and introversion have been studied directly (and indirectly, under different descriptors) by a variety of researchers in education (Amaria & Leith, 1970; Beach, 1960; Grimes & Allinsmith, 1961; Kagan, 1971; Witkin et al., 1977). Each of these researchers used written tests to determine the personality functions; no one has developed an observation instrument by which to determine extroversion and introversion.

Extroversion refers to the way a person prefers to tune in to the world. It is a preference for the outer world of people and things demonstrated by a practical, active, vocal, group orientation. Introversion refers to the preference for the inner world of concepts and ideas demonstrated by a subjective, reflective, individual orientation.

It was the decision of this researcher not to use the terms extroversion and introversion, even though they are the terms coined by Jung. Action-oriented and reflection-oriented were used instead as they contain none of the negative or positive connotations sometimes associated with extroversion and introversion.

This neutrality is an important concept underlying the use of Jungian typology. Myers (1962) stresses this "respectful recognition which type theory accords to opposite kinds of people. Each person is classified in

positive terms, by what he likes, not what he lacks. The theory attaches no a priori value judgment to one preference as compared with another, but considers each one valuable and at times indispensable in its own field" (p. 3).

SYSTEMATIC OBSERVATION

Three major factors influenced the decision to develop an observation instrument rather than to use existing tests such as the MBTI to determine learning patterns in students.

Firstly, most learning style inventories are self-report written instruments. Self-report, like any other behavior, is a product of the individual's total phenomenal field, and is likely to be dependent upon the clarity of the subject's awareness, social expectancy, co-operation of the subject and change in field organization. Moreover, students most in need of diagnostic, prescriptive curriculum design cannot read written tests and/or are test shy (Mamchur, 1978).

Secondly, systematic observation involves the teachers directly in the data gathering process. Fullan and Promfret (1977) in their review of research on curriculum and instruction implementation state that teachers are most likely to use curriculum methods and materials when they have been actively involved in the research responsible for the development of the curriculum or for showing a need for its implementation.

In a pilot study conducted in 1979, Mamchur related empathy and teacher effectiveness gained as a consequence of using AORO. Although the sample was small, the gain in teacher effectiveness (as measured by the Wasicsko-Combs perceptual rating scale, 1978) was significantly positive. That is to say, teachers are most likely to use curriculum methods and materials when they have been actively involved in the research responsible for the development of the curriculum or for showing a need for its implementation.

Using AORO develops a particular skill and serves the precise purpose of aiding teachers in curriculum development. To test if this new knowledge does increase teacher effectiveness is the logical sequel to administration of the instrument. In order to determine if use of the instrument does indeed change teacher behavior, and whether that change results in better learning on the part of the student, more research must be conducted. Hopefully, it can be done in the classroom, by the classroom teacher, using other observation instruments. Many useful instruments are available. *Mirrors for Behavior*, a 14-volume anthology of observation instruments edited by Simon and Boyer (1970), reveals that most instruments focus upon teacher behavior, teacher-pupil interaction, and/or classroom climate. Medley, in *Teacher Competence and Teacher Effectiveness* (1977), provides an excellent source of designs, involving observation instruments, which can be reproduced by the classroom

teacher. It is hoped, then, that the use of AORO is but the first step in a chain of most necessary research in teacher effectiveness.

Combs and Soper (1963) in "Studying the Relationship of Child Perceptions to Achievement and Behavior in the Early School Years" found some interesting results which further support the need to observe students; even in the comparatively short time spent observing subjects, the attempt to see the child and the world through his own eyes provided important insights into individual personalities; and the discipline of looking at children in this way contributed greatly to making teacher observers much more sensitive than they had been before (pp. 135-137).

The instrument, then, involves teachers directly, in a nonevaluative manner in using an instrument which not only allows them opportunity to understand the preferences of each student, to develop curriculum according to those preferences, but which further sensitizes the teacher, makes him more aware, develops a new frame of reference which becomes a natural part of the teacher's thinking and behavior.

This very process is a positive one for both student and teacher, and the interactions which occur between them. Teachers using the instrument reported not only a keener sensitivity but a greater feeling of competence in themselves. If Combs' (1965) notion that teacher educators must concern themselves with providing experiences designed to help student teachers see themselves as adequate, effective people is correct, then the use of observation instruments such as AORO has tremendous implications for preservice education.

Thirdly, systematic observation was chosen as a means of determining preferred patterns of learning because it is becoming more and more highly prized among researchers as a means of gathering data (Dunkin and Biddle, 1974). Systematic observation as opposed to traditional observations is described by Soar, Soar and Ragosta (1971) and Lawrence and Branch (1978) as a precise, non-evaluative system in which the observer is made a recorder and in which items are nonglobal and low-inference. That is, descriptors stay close to the original behavior.

Lawrence and Branch (1978) illustrate the need for low inference instruments in their discussion of peer support systems. Low-inference items are described as being precise and nonevaluative. Although researchers clearly prefer low inference, the caution suggested by Gellert (1955) that low-inference items may distort behaviors in complex situations is well worth heeding. Perhaps the most reasonable approach is the one suggested by Herbert and Attridge (1975), "that items be as low in the degree of observer inference required as the complexity of behavior under study will permit" (p. 1).

Despite its expense and the problem of analysis, observation is becoming recognized as an invaluable research tool in all areas of education; for the raw material of observation is reality itself (Fox, 1969) and the

most important part of schools is what is happening in the classroom (Soar, 1978).

Lower-inference items, because they are specific and nonevaluative, requiring no expertise in being able to distinguish extroverted behavior from introverted behavior, were especially important to this study as it is in the nature of teachers to develop a teaching style according to their own particular typology (as determined by the MBTI and observed by Lawrence and De Novellis (1974). Lawrence and De Novellis reported that the classrooms of observed introverted teachers were significantly more teacher centred and more structured by the institutional materials than were the classrooms of extroverted teachers (p. 4).

DEVELOPMENT OF INSTRUMENT

In designing AORO a list of descriptors was selected from works containing descriptors of Jungian typology (Jung, 1971; Lawrence, 1979; McCauley, 1974; Myers, 1962; McCauley & Natter, 1974; Nuernberg & Lawrence, 1974). Working from this theoretical base, the researcher observed students from four middle schools. A tentative instrument was devised and field-tested. Reliability was determined using interobserver agreement and agreement with an expert rater, from several small samples. Observer consistency using the Kendall Tow Rank Correlation Coefficient for a one-tailed test at the .05 level averaged .80. Although the statistic is positive and significant, the population in each instance was small, ranging from 5 to 15 students. All parts of the pilot study used a small population which made generalizability difficult, but the process of having many different classrooms being observed was useful in developing the instrument as it provided a broad base of behaviors from which to choose the behaviors most common to many classrooms. Several behaviors were eliminated on the basis of being infrequently observed.

To assist teachers to think in terms of curriculum development during the process of observation, this researcher decided to divide the main categories of action and reflection into four subcategories (Table 1).

Although Medley and Mitzel (1963) do not recommend grouping together items from specific categories, as it may lead to halo effect, it was felt that the instrument's added purpose of suggesting curriculum development mandated the subheadings. To assure that teachers were aware of the instrument's possible tendency to allow the rater to cause halo effect, it was clarified in the teacher's manual which accompanied the AORO.

The final form of the instrument was developed and validated (Mamchur, 1978).

The sample drawn for this study consisted of 40 students from Lincoln Middle School. Lincoln Middle School was selected because students and

TABLE 1
*Curriculum Categorization
Design of
AORO*

<i>Action Oriented</i>	<i>Reflection Oriented</i>
1. Prefers to act, then to think — learns by doing	1. Prefers to think, then to act — learns by thinking, then doing
2. Prefers to work with other people — learns by interacting	2. Prefers to work alone — learns on his/her own
3. Prefers to work orally — learns by talking	3. Prefers non-oral learning — does his/her best work in his/her head
4. Prefers to do something he/she can see a practical use for	4. Prefers his/her own internal source of motivation

NOTE: From Mamchur, C., *Development of a systematic observation instrument for measuring action orientation or reflection as preferred learning patterns of children*. 1978. University of Florida, 1978. Copyright 1978 by University of Florida.

teachers were organized in teams, so that one team of teachers is very familiar with the same group of students, having taught the group for a three-year period. One specific team was chosen because it was recommended by an inservice project supervisor as a team which organized its classes in such a way as to allow the students to make choices. Observed behavior, then, would indicate student preferences, and not teachers’.

The team agreed to have their classes be subjects for the study, and also consented to be teacher observers. Outside observers were chosen from a group of student teachers.

Each pupil was observed 15 times, nine times by teacher observers (three time each by three teachers) and six times by outside observers (three times each by two outside observers). Checklists to determine extroversion and introversion passed on a questionnaire developed by Lawrence (1979) to determine Jungian type were designed by the researcher. The checklist was devised to include seven forced-answer questions which would classify the student as action or reflection oriented. Each pupil was rated, according to this checklist, by the team leader, by a parent and by the pupil himself.

Reliability was determined by correlating teacher observation scores with each other, and with teacher-rated scores. Observation scores were determined by adding up the number of checked behaviors in each category (action and reflection oriented). A value of 1 was assigned to behaviors observed as “mildly evident” and a value of 2 for “very evident.” A total value (based on all the observation periods for one study by one observer) was determined for each category. One final score was

then calculated by subtracting the less frequently occurring category from the more frequently occurring. The difference became the score for that student, in the category which was the greatest. To determine whether or not teachers with no general experience with teaching and no specific knowledge of the subjects could use the instruments, outside observer scores were correlated with teacher observation scores.

Pearson Product Moment Correlation and Spearman Rank Correlation Coefficients were calculated to test the design. Average r and S_r correlations between the teacher observers and teacher rater were .91 and .90, respectively, and showed significant and positive agreement. Correlation scores between teacher rater and parents of middle school students were .70 and .60, respectively, and were positive and significant. All other correlations tested between outside observers and between teacher observers, teacher rater, and self-rater showed no greater degree of agreement than would be expected on the basis of chance.

A limitation to the study was that, as data were collected in June, year-end activities made it difficult for outside observers to identify and observe the students in the observation periods set up for them. Because it is so important for teachers to determine cognitive style early in the school year so that prescriptive curriculum planning could commence at optimal times, it was decided to retest the degree of inference of AORO under more ideal conditions. Moreover, determining if student teachers having little teaching experience could reliably observe learning preferences in students whom they did not know would make AORO a useful instrument for not only experienced but inexperienced teachers.

Essentially the question was asked: How much evaluation and expertise are necessary to use AORO? A second study was conducted in 1979. Pearson Product Moment Correlations were used to determine inter-observer agreement between nine student teachers observing 10 middle school students. Each observer agreed with every other observer in the determining of action or reflection orientation for all 10 students except in one instance. That is, all correlations, except one, being well over the critical value of .49 and the .05 level of significance for a one-tailed test with an n of 40, were significant and positive. These correlations support the hypothesis that student teachers with no prior teaching experience and no familiarity with the students being observed can recognize students' preferences for action or reflection orientation by using AORO. AORO, then, allows both novice and experienced teachers to determine preferred patterns of learning in students. With this knowledge, it is hoped teachers can design curriculum in such a way as to guide children into adolescence in such a manner that they have a clear concept of their own strengths and weaknesses. It is a process of individualized guidance culminating in greater independence for the child. Such independence promotes psychological maturity, improves cognitive achievement (Myers, 1962) and reduces teacher workload by having the natural, organic

forces of behavior work for (rather than against) the total learning process.

PRACTICAL IMPLICATIONS FOR LEARNING

Some practical examples of curriculum planning according to theoretical and clinical description of action-orientation would be:

1. Group students so that they may discuss issues of importance, as extroverts learn as they interact talking about a topic;
2. Create an atmosphere in which it is safe to make mistakes, as extroverts learn by trial and error;
3. Set up learning centres in which students can move about from project to project, as extroverts have a short attention span, enjoy variety, and need to be able to physically move about in the classroom;
4. Provide opportunities for students to be evaluated orally or in a practical way, as extroverts do well in verbal transactions and are very practical in orientation;
5. Be patient and encouraging when giving directions, providing guidelines, and in allowing students to study one another's work, as extroverts prefer an external source of motivation and derive great pleasure from pleasing others;
6. Give precise, patient guidance in having students work alone on completing a long or complex project, as this is especially difficult for an extrovert.

In planning for reflective-oriented students, the teacher could:

1. Take precautions in questioning the class, extending wait time after a question is asked, writing questions on the board before questioning begins, having students write down their answers to questions before giving them orally, as introverts need time to reflect before answering. (Because extroverts don't, they usually tend to dominate the question-answer phase of learning).
2. Have a space (such as carrels) available in the classroom in which students can isolate themselves when they feel a need, as introverts hate interruptions when working, need to be private in their own territory to complete tasks or to "charge up their batteries" before they enjoy interaction;
3. Team students who have similar interests, as introverts work well in pairs or very small groups, especially with people whom they trust and/or with whom they share a common interest;
4. Be patient when some students tend not to open up emotionally, appear difficult to understand, or have little regard for external sources of motivation, for these patterns are natural to the introvert;
5. Allow plenty of preparation time and choice in making oral presentations, as only under these circumstances does the introvert comfortably perform such tasks;

6. Provide opportunity for students to read for pleasure or escape to complete library projects and to complete written assignments, as the introvert excels in these areas.

We assume primarily that the extrovert learns better if experiences and action come before concepts and ideas are expected to be learned. Introverts, on the other hand, learn better if concepts are presented before experience and action. Another important distinction is that the extrovert's outspokenness makes him visible in the class, whereas the introvert's quiet, reserved nature may cause him to be underestimated or ignored in a classroom.

Although a good deal of attention has been paid to matching curriculum to a student's learning style (Dunn & Dunn, 1978; Gordon, 1966; Hill, 1971; Hunt, Harvey & Schroeder, 1961; Kagan, 1971; Thelen, 1967), it is important to remember that at times students will benefit from being urged to develop a learning style less natural for them (Cronbach & Snow, 1977, p. 478; Solomon & Kendall, 1967, p. 211). Timing seems to be a key here. A safe rule is to match or mis-match learning style according to the degree of confidence or skill demonstrated by the students. Once they feel comfortable or knowledgeable in an area, it is more likely they will have more desire to try and success in trying patterns of learning that do not come naturally. Moreover, it is essential that students be allowed to develop their strengths to such a degree that they will ultimately feel confident enough to use either extroversion or introversion as the situation demands. This is a sign of maturity and independence and totally balanced development.

CONCLUSION

Teachers in the field, their feelings, their needs, frustrations and successes, must not be neglected. As the perceptual psychologists so often remind us, it is how the teacher perceives himself and his students which is of prime importance in the classroom.

AORO attempts to turn the natural art of teaching into scientific proportions whereby the student's uniqueness is recognized, where teacher effectiveness is improved and where both feel better about themselves and each other.

There was no question in Jung's mind that educators were the most potent influence on the child's individuation, and were even more potent than the parents. . . . Teachers are in a position to recognize disharmonies in a child's personality and to help him strengthen the weaker elements . . . The most important function of the teacher, however, is to recognize the individuality of each of his pupils and to foster the balanced development of this individuality. (Hall, Nordby, 1973, p. 87)

In a vastly complex world in which creative potential may be man's only hope for retaining any semblance of what is now considered our

humanity, and in a time when such men as Torrance and Rogers insist that the most fundamental condition of creativity is an internal locus of evaluative judgment, this plea for recognition and fostering of individuality may have a far more significant impact on our future than any of us can yet imagine.

NOTES

Portions of this paper were presented earlier as part of the author's doctoral dissertation, *Development of a systematic observation instrument for measuring action orientation or reflection orientation as preferred learning patterns of children*, University of Florida, Gainesville, Florida, 1978.

¹ Copies of this instrument may be obtained by contacting the author directly.

REFERENCE NOTE

Guttinger, H. Continued research on an experiment in development individualized reading — Research Monographs (in progress), P. K. Yonge Laboratory School, Fla.

REFERENCES

- Amaria, R., & Leith, G. Individual versus cooperating learning. *Educational Research*, 1970, 11-12, 193-199.
- Beach, L. Sociality and academic achievement in various types of learning situations, *Journal of Educational Psychology*, 1960, 51(4), 208-212.
- Combs, A. *The professional education of teachers*. Boston: Allyn & Bacon, 1965.
- Combs, A., & Soper, D. *The relationship of child perception to achievement and behavior in the early school years*. Cooperative Research Project, No. 814, 1963.
- Cronbach, L., & Snow, R. *Aptitudes and instructional methods*. New York: Irvington, 1977.
- Dewey, J. *The source of a science of education*. New York: Liveright, 1929.
- Dunkin, M., & Biddle, B. *The study of teaching*. New York: Holt, Rinehart & Winston, 1974.
- Dunn, R., & Dunn, K. *Teaching students through their individual learning styles*. Reston, Virginia: Reston Publishing Co. Inc., 1978.
- Fox, D. *The research process in education*. New York: Holt, Rinehart & Winston, 1969.
- Franz, M. L., & Hilman, J. *Jung's Typology*. Dallas, Texas: Spring Publications Inc., 1979.
- Fullan, M., & Pomfret, A. Research on curriculum and instruction implementation. *Review of Educational Research*, 1977, 47(1), 335-397.
- Gellert, E. Systematic observation: A method in child study. *Harvard Educational Review*, 1955, 24-25, 179-195.
- Gordon, I. *Studying the child in school*. New York: John Wiley & Sons, 1966.
- Grimes, J., & Allinsmith, W. Compulsivity, anxiety and school achievement. *Merill-Palmer Quarterly of Behavior and Development*, 1961, 1(4), 247-271.
- Hall, C., & Nordby, V. *A primer of Jungian psychology*. New York: New American Library, 1973.
- Herbert, J., & Attridge, C. A guide for developers and users of observation systems and manuals. *American Educational Research Journal*, 1975, 12(1), 1-20.

- Hill, J. *The educational sciences*. Oakland: Oakland Community College, 1971.
- Hunt, D., Harvey, O., & Schroeder, H. *Conceptual systems and personality organization*. New York: John Wiley & Sons, 1961.
- Jung, C. *Psychology types*. Princeton: Princeton University Press, 1971.
- Kagan, J. *Understanding children*. New York: Harcourt Brace Jovanovich, 1971.
- Lawrence, G. *People types, tiger stripes*. Gainesville, Florida: Center for Applications of Psychological Type, Inc., 1979.
- Lawrence, G., & Branch, J. Peer support systems as the heart of in-service education. *Theory into practice*, June 1978, in press.
- Lawrence, G., & De Novellis, R. *Correlation of teacher personality variables (Myers-Briggs) and classroom observation data*. Paper presented at the annual meeting of the American Educational Research Association, University of Florida, 1974.
- McCaulley, M. *The MBTI and the teacher-learning process*. Paper presented at the annual meeting of the American Educational Research Association, Chicago, 1974.
- McCaulley, M., & Natter, F. *Psychological (Myers-Briggs) type difference in education*. Report prepared for The Governor's Task Force on Disruptive Youth, Phase II, Florida, 1974.
- Mamchur, C. *Development of a systematic observation instrument for measuring action orientation or reflection orientation as preferred learning patterns of children*. Doctoral dissertation, University of Florida, 1978.
- Medley, D. *Teacher Competence and Teacher Effectiveness*. Washington: American Association of Colleges for Teacher Education, 1977.
- Myers, I. *Manual (1962) the Myers-Briggs Type Indicator*. Princeton: Educational Testing Service, 1962.
- Nuernberger, A., & Lawrence, G. *Personality influences in teaching and learning*. Unpublished module for the Florida Educational Research and Development Program, Florida, 1974.
- Rosenshine, B., & Furst, N. The use of direct observation to study teaching. In R. M. W. Travers (Ed.), *Second hand-book of research on teaching*. Chicago: Rand McNally, 1973, 122-183.
- Soar, R., Soar, R. M., & Ragosta, M. *Florida Climate and Control System*. Observer's manual prepared for the Institute of Development of Human Resources, University of Florida, 1971.
- Solomon, D., & Kendall, A. *Final Report: Individual characteristics and children's performance in varied educational settings*. Rockville, Maryland: Spencer Foundation Project, 1976.
- Thelen, H. *Classroom grouping for teachability*. New York: John Wiley & Sons, 1967.
- Wasicko, M. *A research-based selection instrument*. Unpublished research report. Gainesville: Florida Educational Research and Development Council, 1978.
- Witkin, H., Moore, C., Goodeough, D., & Cox, P. Field-dependent and field-independent cognitive styles and their educational implications. *Review of Education Research*, 1977, 47(11), 1-64.