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ABSTRACT

An inservice consultation program between teachers and a school psychologist was designed to establish classroom conditions to improve 7th- and 8th-grade students' (N=233) thinking skills. Inservice training conducted by the psychologist emphasized encouragement of ideas, modeling thinking skills, opportunities for practice, and support of diverse approaches to tasks. Teachers and the school psychologist collaborated on skills application during 8 months of consultation. Also collected and presented were data from monthly observations of classroom interaction. Students completed Torrance Tests of Creative Thinking and both teachers and students completed the Classroom Activities Questionnaire, which measures perceptions of the thinking skills environment. Torrance scores did not increase but posttest differences in favor of the consulting group were observed on classroom climate observations. It was concluded that a teacher/school psychologist consultation program enabled teachers to increase motivational climate. In conclusion, inservice training and consultation enabled teachers to structure a classroom environment and model and describe thinking processes to support students' higher level (divergent) thinking. (ABL)

Teacher Consultation to Develop Students' Higher Level Thinking Skills

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TEACHER CONSULTATION TO DEVELOP THINKING SKILLS

Abstract

An inservice consultation program between teachers and a school psychologist was designed to establish classroom conditions to improve seventh and eighth grade students' thinking skills. Inservice training conducted by the psychologist emphasized encouragement of ideas, modeling thinking skills, opportunities for practice, and support of diverse approaches to tasks. Teachers and the school psychologist collaborated on skills application during eight months of consultation. Also collected and presented were data from monthly observations of classroom interaction. Students completed Torrance Tests of Creative Thinking and both teachers and students completed the Classroom Activity Questionnaire, which measures perceptions of the thinking skills environment. Torrance scores did not increase but posttest differences in favor of the consulting group were observed on classroom climate observations. It was concluded that a teacher/school psychologist consultation program enabled teachers to increase motivational climate.

Teacher Consultation to Develop Students' Higher Level Thinking Skills

Thinking skills such as posing questions and solving problems characterize the academic goals emphasized in the National Conference Association report (Sheingold, 1991). These goals acknowledge the value of teaching students how to think about problems and solutions rather than how to memorize facts. However, elevating students' thinking skills requires changes in teaching approaches and expectations for student behavior. At a time when many of our nation's schools are seeking to infuse their curricula with higher level thinking skills instruction, school psychologists are well positioned to help teachers alter their teaching strategies. Functioning as a school-wide resource for thinking skills development, the school psychologist can provide continuous, on-site staff support for curricular change.

Research has provided information about the classroom conditions or environments necessary for the development of thinking skills. Several researchers believe the general factors contributing to a classroom

environment supportive of the development of thinking skills are: (a) external and internal student motivation and aptitude (Hennessey & Amabile, 1988); (b) the social and academic climate created within the classroom, including teacher and peers, (Feldhusen & Treffinger, 1977; Goodale, 1970; Isaksen & Parnes, 1985); and (c) the quality and intent of the teacher (Costa, 1985; Presseisen, 1987; Swartz, 1987). The classroom environment supporting higher level thinking skills is a combination of the teacher's ability to encourage and model such higher level thinking skills as analysis, synthesis, and evaluation, and the degree to which students are observed practicing those skills.

To increase student thinking skills, researchers recommend specific teaching behaviors such as asking open-ended questions, stimulating class discussions, and encouraging student independence (Feldhusen & Treffinger; Flemming, 1987; Goodale; Isaksen & Parnes; Moses, 1985; Presseisen). These teaching behaviors can be conveyed to teachers as methods to modify the classroom instructional environment to encourage thinking skills. According to Houtz and Denmark (1983),

the supportive classroom environment is defined as "the intended organization and focus of the teacher on the reinforcement and encouragement of a variety of higher level thinking skills within the everyday classroom curriculum" (p. 21). Clearly, the teacher is a primary influence on the classroom environment. Teachers wishing to create a classroom environment which supports students' higher level thinking can participate in workshops or institutes offered by a variety of professional organizations or inservice programs and courses conducted by local schools or universities.

However, another method for teacher development involves the school psychologist functioning as an inservice trainer and consultant, working collaboratively with the teacher. Instructional consultation is becoming a significant part of the work of many school psychologists (Conoley & Conoley, 1986; Conoley & Gutkin, 1986; Harris & Cancelli, 1991; Rosenfield, 1987). Because of their training and position in schools, school psychologists can work with teachers throughout a problem. They can be involved in

goal-setting, problem identification, intervention and recommendation, implementation, and follow-up activities--in short, all stages of problem solving (Babcock & Pryzwanski, 1983; Harris & Cancelli). Conducted as true collaboration, where both parties to the process depend upon each other for input and evaluation, instructional school consultation can be a powerful means of teacher inservice development.

Other models of consultation--mental health, medical, and behavioral--place the consultee in a dependent role, acting as facilitators of the consultant's interventions. The collaborative consultation model is often preferred by educational professionals because of the high degree of interaction through all stages of consultation (Babcock & Pryzwanski, 1983). However, despite its growing popularity, there are too few research studies on the effectiveness of specific consultation programs in changing teacher and student behaviors. Therefore, the purpose of this study was to investigate the effects of consultation between teachers and a school psychologist designed to establish classroom conditions which

support the teachers' efforts to develop students' higher level thinking skills and the students' perception of those efforts.

Method

Subjects

The subjects for this study were 233 seventh and eighth grade students from two schools in different counties in a rural but generally high socioeconomic area in New Jersey in which 98% of students are Caucasian. In one school, two teachers responsible for five language arts classes of 48 seventh grade and 38 eighth grade students volunteered to participate in a consultation program. In a second school, six teachers of 11 language arts classes of 87 seventh and 60 eighth grade students agreed to participate in pre- and posttesting and monthly classroom observations for comparison purposes.

Materials

Classroom environments. Assessment of classroom environments as intended by the teacher and perceived by students was measured with two instruments, a paper-and-pencil questionnaire and an observation scale. The

Class Activities Questionnaire (CAQ) (Steele, House, & Kerins, 1971) was completed by students and teachers to measure their perceptions of the classroom activities which tended to be emphasized during academic instruction. This 25-item inventory required teachers and students to indicate on a 4-point scale how strongly they agreed or disagreed with statements which described their class.

Statements were related to levels of thinking emphasized as well as levels of affect or social interaction. The item statements were clustered together to compose four dimensions or areas of emphasis: 1) lower thought processes, such as recall of information and paraphrasing; 2) higher thought processes, such as production of ideas and solutions; 3) classroom focus, distinguishing between the students' role as initiators of discussions or recipients of the teacher's information; and 4) classroom climate, measuring level of student enthusiasm for learning activities, and the teacher's tolerance for student independence and initiative. Reliability for the CAQ is reported to be approximately

.80 and validity information relating CAQ scores and student performance appears promising (Houtz & Denmark; Steele, House, & Kerins).

The second instrument used to measure instructional climate was the Classroom Creativity Observation Schedule (CCOS) (Denny, 1968, 1969). The CCOS focused specifically on the teacher's intention to create a motivational climate as well as the teacher's role in encouraging divergent thinking and pupil-teacher and pupil-pupil interactions. The CCOS consists of four parts, or schedules. Schedule A measures motivational climate, variation in amount of uniqueness in classroom materials, encouragement of convergent and divergent thinking, and pupil initiative in the control of instruction. Schedule B measures pupil-teacher, teacher-pupil, and pupil-pupil relationships as well as overall teacher approach.

Schedule C measures teacher allowance for individual differences and encouragement of unusual responses and Schedule D measures variation in the amount of classroom activities and instructional materials. Observers rate items from Schedules A and B

on a 5-point scale or simply tally the frequency of certain behaviors in Schedules C and D. Reliabilities for the different schedules and items within them vary considerably (Denny, 1968). However, six items from Schedules A and B were selected for their relevance to the consultation program. Their reliabilities ranged from .60 to .86, with a mean of .73.

Training for the CCOS was conducted with a teacher selected from the substitute teacher list at the consultation school. The CCOS observation form and recording procedures were reviewed with the observer during a 3-hour training session. The observer was provided a tape recording and earphones which served as a timing device indicting when she should record teacher and student behaviors. The observer practiced recording student and teacher behaviors for six 30-minute periods in classrooms not participating in the study at the consultation school. During the practice recordings, the observer made extensive notations about scoring of teacher and student interaction and classroom activities. The consistency and accuracy of practice scoring was reviewed. A second review of

procedures was conducted immediately following two morning and two afternoon observations of participating classrooms in order to confirm consistency of scoring. In addition, at the conclusion of each monthly observation, the observer and experimenter reviewed scoring.

Divergent thinking. The Torrance Tests of Creative Thinking (TTCT) (Torrance, 1974/1990) Verbal Forms A and B were used pre- and post-consultation to assess divergent thinking or the ability to generate numerous and diverse ideas. The TTCT yields scores for fluency, flexibility and originality of responses. Fluency is the absolute number of relevant responses for a given activity. Flexibility is the total number of different categories of responses. Originality is a measure of how infrequently certain responses occur in the normed population. More points are awarded for rare responses. The Torrance Tests are the most widely used instruments for assessment of creative potential and have a large literature to support their use. Evaluations of the tests suggest reasonably high levels of reliability and some evidence for construct and

criterion validity (Buros, 1978; Crockenberg, 1970; Harvey, Hoffmeister, Coates, & White, 1970).

Procedures

Pretest-posttest design. The study was conducted for a period of eight months during October through May of one school year. Prior to the beginning of the consultation experience, two substitute teachers received training in administration of the CAQ and TTCT and one substitute teacher was trained to observe classroom interactions with the CCOS. For pretests, students and teachers completed the CAQ, students completed the TTCT, and baseline observations were made of classes in both schools. Observational data were then gathered on a monthly basis as part of the consultation program. Finally, posttest CAQ, TTCT, and CCOS data were gathered in May by the same testers. CAQ data were scored by the experimenter at the conclusion of the study. TTCT responses were professionally scored by Scholastic Test Service.

In-service training and teacher consultation. In-service teacher training was conducted with the two consultation teachers together on two consecutive

mornings over two weeks during an extra 40-minute preparation period provided by the school administrator. Teachers were provided a booklet prepared by the psychologist containing an outline of four principles forming the core of the inservice training. The four principles and strategies were a consolidation of research efforts by Feldhusen and Treffinger (1977) and Torrance and Myers (1970) about teacher behaviors which support increases in student creative thinking:

Principle 1: Structure the class for creative thinking by conveying a positive, accepting, and affirming environment. A positive environment is created by treating questions and suggestions with respect. Supporting and reinforcing developing ideas and responses in a non-evaluative manner provides security and freedom necessary for exploratory thinking.

Principle 2: Describe and model processes used for more creative thinking. This principle serves as an advanced organizer for student learning. Terms,

such as "compare" and "analyze" will label teacher-modeled behaviors.

Principle 3: Use discussion and divergent, open-ended questions to provide students with practice and feedback about skill development. Mistakes are treated as occasions for learning, rather than as failures.

Principle 4: Encourage and expect diversity of student interests and approaches to tasks. Teacher flexibility in achieving curriculum goals conveys respect for individual differences and allows students to succeed.

Teachers were informed about specific behaviors or strategies which they might practice. Teacher behaviors which encourage student responses were identified as: (a) silence or wait time, (b) passive or active acceptance, (c) clarification of student responses, and (d) facilitation of data acquisition. Wait time is an effective technique which conveys to students that the delayed teacher response of a few seconds will enable students to reply in whole sentences with complete and creative ideas (Good & Brophy, 1991; Gooding, Swift & Swift, 1983; Moses; Rowe, 1974). Active acceptance is

intended to convey a psychologically safe climate for the sharing of student ideas and values. Clarification of responses also conveys acceptance of student ideas, with a request for more information. Finally, facilitation refers to the teacher's efforts to provide information or feedback, or to arrange the environment so students can secure their own knowledge, e.g., dictionary or laboratory equipment for experiments.

Inservice training components suggested by Joyce and Showers (1990) were incorporated into the program: explanation of theory, modeling of desired behaviors, practice, structured or open-ended feedback, and coaching. The theoretical basis for the concepts were briefly presented, followed by verbal and printed examples of the proposed teacher behaviors. Teachers practiced the behaviors and phraseology just modeled, modified to suit their own teaching style. Consistent feedback about observations of the teachers practicing the skill helped teachers make and maintain changes. On occasion, coaching in class assisted with transfer of skills.

Consultation began when pretest data were complete. Individual consultation meetings were held in each teacher's classroom within the same week the class had been observed. Regularly scheduled consultation meetings and brief weekly meetings resembled collaborative consultation stages presented by Babcock and Pryzwansky. For example, during the regularly scheduled meetings when teacher and psychologist discussed classroom observation data, the first and second stages of the consultation model might be engaged (specifically, goal setting and problem identification). Subsequent weekly meetings were constructed to move through the other stages of consultation, such as the intervention-recommendation stage, implementation, and follow up.

The psychologist attempted to augment collaborative consultation by assuming the "resource collaborator" role suggested by Tyler, Pargament, and Gatz (1983). For example, teachers agreed with the psychologist that visual aids describing the different thinking skills would be helpful. The psychologist constructed two wall-size charts of Bloom's (1956)

lower and higher level thinking skills, accompanied by verbs which described the skills. The basis for these charts was an article by Hoelzel (1987), describing her success using similar visual aids in her fifth grade class. An example of the wall chart with the thinking skill in capital letters was provided to experimental teachers follows:

COMPREHENSION

describe	explain	review
identify	illustrate	compare

The psychologist modeled how the charts might be used and teachers practiced incorporating the information into their lesson plans and teaching styles. Teachers reported that the wall charts were extremely helpful in reminding them to incorporate the principles and strategies discussed during inservice training and were also interesting to students.

Three topics formed the basis of each consultation meeting: the teacher's attempts to change her instructional behaviors to increase student thinking,

classroom management techniques, and changes in student behavior which approximated the teacher's goals. Teachers discussed their attempts to change some instructional behaviors that discourage student thinking and responses, such as criticism and praise (Costa, 1985). Also, teachers tended to talk about their efforts to use suggested principles and strategies and discuss difficulties attempting to change their own behavior. They were encouraged to focus initially on one or two principles, rather than all four at once. In addition to discussing changes in instructional approaches, teachers and the psychologist discussed classroom management techniques and changes in student behaviors. Data about classroom management techniques and student behaviors were available from the CCOS. The psychologist provided feedback about results of the CCOS observation and elicited teachers' perceptions about classroom conditions or problems.

At the conclusion of each regularly scheduled consultation meeting, the teacher and psychologist discussed goals or objectives for the coming period and strategies for implementation. Additionally, brief

individual consultation meetings were held at unspecified times of the day of varying duration during each week of the study. These meetings were usually, but not exclusively, initiated by the psychologist. The brief meetings served to maintain the teacher-psychologist relationship and to monitor specific behavior or classroom situations previously discussed.

Results

Four CAQ scores were obtained for both teachers and pupils, pre- and posttest. Pre- and posttest fluency, flexibility, originality, and average scores were obtained for pupils from the TTCT. The six items refered to above from the CCOS were combined to yield a total classroom climate score, pre- and posttest.

Intercorrelations were computed among these scores. As expected, the three Torrance scores were substantially correlated, ranging from .74 to .90 on the pre- and posttestings and for consultation and comparison groups. To a lesser extent, but generally still statistically significant, were the intercorrelations among the four CAQ scores, ranging from .03 to .56 for both groups and testings. TTCT and CAQ

scores were not correlated significantly, however, for either consultation or comparison pupils or pre- and posttest results.

For the CCOS, class means had to be used as the unit of analysis and correlations among the six scores for the consultation and comparison teachers and from pre- to posttest were rarely significant, due largely to the small n. However, two items from the CCOS--motivational climate and emphasis on divergent thinking--correlated substantially (r=.87, df=14, p<.05) at posttest and with the CCOS total climate score (r's=.84 and .80, respectively).

Given the above correlation results, the following analyses were computed. To assess the initial equality of consultation and comparison groups, independent t tests were computed for the class as the unit of analysis for the CCOS, the CAQ, and the Torrance Tests. Analyses were also computed using individual student scores for the CAQ and TTCT average score. No significant differences between consultation and comparison groups were obtained on any analysis.

Insert Table 1 about here

Furthermore, no significant differences on CCOS motivational climate, divergency, or the total climate score were observed at pretest. Keep in mind that independent, univariate t-tests were computed because no significant intercorrelations among the TTCT, CAQ, and CCOS scores were observed. Table 1 contains the pretest and posttest means and standard deviations for consultation and comparison group pupils.

Post-treatment differences were analyzed using the same series of analyses. Class averages for the CCOS, CAQ, and TTCT were compared. Also, individual student scores were compared for the TTCT and the CAQ. There were no significant t-test differences on TTCT scores. However, the consultation group scored significantly higher than the comparison classes on the posttest total climate score of the CCOS ($t=2.24$, $df=14$, $p<.05$). Individual t-tests of the motivational climate and divergency subparts of the total climate score were both significant as well (t's=4.72 and 4.99,

respectively). And, at the $p<.10$ level, using individual pupil ratings from the posttest CAQ, the consultation group had higher ratings of emphasis on higher-level thinking skills than did the comparison group ($t=1.73$, $df=197$, $p<.10$).

Discussion

The limitations of this study must be readily acknowledged. No significant differences were observed on pupils' divergent thinking. There were only two teachers and five classes involved in the consultation experience and six teachers with 11 classes in the comparison school. The low n for the analyses based on class averages certainly limits statistical power and external validity. More work is needed.

However, the results of this study provide some evidence that inservice training and a consultation program enabled teachers to alter some aspects of their instructional behavior enough that a third party observer was able to note the differences. And, if one uses a one-tailed test of statistical significance, there is some evidence that pupils did

perceive changes in classroom instructional emphases as well.

These results suggest that the inservice/consultation program was not ineffective. A few counter explanations might be advanced, of course, for the significant findings. One, the experimenter effect, might be entertained because the senior author, the school psychologist conducting the consultation program, was naturally aware of the nature of the study. A second, that of measurement bias, might be advanced because the CCOS observer, a regular substitute teacher, was naturally aware of the consultation teachers' involvement.

Both of these concerns may be minimized, however, due to the sheer length of the consultation program. Eight months, nearly a full school year, may be considered too long a time for the experimenter or measurement bias effects to sustain themselves. Keep in mind that the school psychologist/senior author was a regular staff member in the school, was well-known to the teachers and knew the teachers well. The same is to be said for the substitute teacher/observer who also

visited consultation teachers' classes on a regular basis throughout the school year. One might argue that had there been a systematic bias in this program, many more significant findings may have been observed.

The concept of school-based consultation involves on-going contact between consultant and consultee. A truly collaborative consultation will produce significant knowledge and understanding between each party about the other. It is safe to say that both the psychologist and the teachers in the present program worked to achieve its goals. And, it is reasonable to conclude, therefore, that the experimenter effect, if present in any consequence, was a natural part of this consultation experience and would be so in any other type of consultation.

As for a possible measurement bias in the observer's work, the fact that the consultation experience included regular feedback and discussion with teachers about the observer's CCOS ratings strongly suggests that biases, if there were any, were minimal. In reality, it is more reasonable to expect that during the consultation program, measurement

practice became more precise, as the psychologist and the observer had regular opportunities to review the ratings and hone observational skills. To speculate, it is not impossible that the length and intensity of the consultation program might even make it more difficult to show changes as observers come to have more complete understandings of the ratings categories and examples of behaviors which are to be rated at various levels.

The simple strengths of the study are that a detailed, multi-faceted consultation program was carefully designed and implemented. The program functioned according to a well-developed model of school-based, instructional consultation. Positive working relationships between the psychologist/ consultant and two teachers/consultees were established. Substantial theory and literature supported the choice of problem and were available to all parties in response to concerns and issues which developed throughout the course of the program. To evaluate the effectiveness of the program, a variety of measures was employed, including student outcomes (the TTCT), perceptions of outcomes (the student CAQ), self-

perceptions (the teachers' CAQ), and a behavioral measure (the CCOS).

This study did not show that the consultation improved direct student outcomes. From Table 1 it is obvious that growth in TTCT scores occurred for both consultation and comparison pupils. Such growth over the course of one school year is consistent with data reported by Torrance in norms for the TTCT. This result does not, however, invalidate the concept of consultation. Rather, it suggests that the link between teacher behaviors or classroom climate and student achievement is not always obvious or direct (Brophy & Good, 1986) and that more research is needed on our theories of learning and instruction. The simple strengths of this study center on the idea of putting consultation models into practice, of trying out a collaborative consultation program in a real school with a worthwhile problem, and of designing and carrying out such a program in a way that affords some method of systematic evaluation on a scale large enough to provide a variety of data.

A final note concerns a more informal and qualitative aspect of the overall evaluation of the program. According to Joyce and Showers (1981), improving existing skills is accomplished more quickly because it is considered a consolidation of a behavior already in the teacher's skill repertoire. Some of the thinking principles and strategies described during the inservice training in this study were considered by the teachers more difficult than others to implement. For example, Principle 1 (structure class for creative thinking) was considered the least difficult to implement and seemed to be related to the establishment of a motivational climate. Principle 3 (use discussion and open-ended questions to provide practice for skill building) was evaluated by teachers as the next least difficult principle to implement and seemed to have contributed to the teacher's role in encouraging divergent thinking. Principle 2 (describe and model processes used for more divergent thinking) and Principle 4 (encourage and expect diversity of student approaches to tasks) were considered the most difficult to implement. Principles 1 an 3 appear to have been

less intrusive and perhaps more similar to existing teacher skills than were Principles 2 and 4. The teachers' acceptance of the intervention (Conoley & Gutkin; Witt & Elliot, 1985), specifically the value of teaching thinking skills, is an important consideration. During inservice training, the teachers and psychologist briefly considered the theory and value of thinking skills instruction. Teachers did not express opinions conflicting with the training, although they were not directly asked. However, during the consultation phase of the study, one teacher expressed her belief that opportunities for oral reading needed to be provided to build students' self-confidence. Considering the time constraints within a class period, this teacher was struggling with her established value for oral reading and a "new" value for thinking skills. Her acceptability level for the intervention may have influenced her perception of which principles were difficult to implement. As Witt (1986) noted, teachers may theoretically agree to the intervention, but during consultation, when the details

of the intervention are discussed, some teachers may become resistant.

In conclusion, inservice training and consultation enabled teachers to structure a classroom environment and model and describe thinking processes to support students' higher level (divergent) thinking. The consultation group achieved significance on two subtests of the Classroom Creativity Observation Schedule, which were motivational climate and divergent thinking, and on perceptions of higher-level thinking skills emphasis on the CAQ. Although students used the higher level skills of analysis and synthesis in language arts instruction, transfer of those skills to a written test (the TTCT) was not evident. However, application of the consultation model may be considered an important contribution in its own right, by helping to build a sound literature regarding consultation practice.

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Table 1

Means and Standard Deviations on Pretest and Posttest Measures for Consultation and Comparison Pupils

	Consultation		Comparison	
Measures	Pre	Post	Pre	Post
TTCT Average				
M	80.55	89.94	79.16	91.72
SD	14.51	17.94	15.08	16.41
N	72	65	128	115
CAQ Higher Thought Processes				
M	2.19	2.31	2.10	2.20
SD	.44	.45	.40	.44
N	72	70	129	134
CCOS Total Climate Score				
M	8.46	13.74	11.51	9.10
SD	3.16	2.59	3.24	2.45
N	5	5	11	11
CCOS Motivational Climate				
M	3.04	3.68	3.22	2.32
SD	.65	.62	.57	.44

Table 1 (continued)

CCOS Emphasis on Divergent Thinking				
	M	.94	3.50	1.56	1.27
	SD	.30	1.30	.92	.32