ABSTRACT
        This study investigated the effectiveness of an
observational technique developed to study characteristics of the
Individually Prescribed Instruction (IPI) system and the extent to
which IPI adapts to individual student differences. Subjects for the
study were students from a second grade IPI classroom of an
inner-city public elementary school. The results of the study have
been analyzed in terms of the following four basic topics: (1) the
distribution of student time spent in different types of activities,
(2) the sequential effects of the different activities, (3) frequency
and duration of activities, and (4) qualitative aspects of the
activities. (Author)

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LEARNING ACTIVITIES IN INDIVIDUALLY PRESCRIBED INSTRUCTION [1] [2] [3]

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LEARNING ACTIVITIES IN INDIVIDUALLY PRESCRIBED INSTRUCTION

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A major goal of the Primary Education Project (PEP) and
Individually Prescribed Instruction (IPI) programs (see Appen-
dix) is to adapt the educational system to individual differences,
and the extent to which this adaptation occurs is under continuous
study and evolution. The major purposes of this pilot study were:
(1) to determine whether or not distinctive patterns of behavior
exist for slow and fast students, and (2) whether or not, and
the degree to which, the IPI system attempts to adapt its in-
structional procedures to these behavior patterns.

Method

Measures of Adaptability

The question posed is how well the IPI system actually
adapts to individual differences. In order to measure adapt-
ability, one can observe rates of progress and mastery time.
One can also measure general achievement and changes of ap-
titudes. These measures are very useful in comparing the
academic achievement produced by IPI to that produced by other
systems. Both Resnick (1967) and Lindvall and Bolvin (1966)
have predicted that under an individualized instructional
system, students will show a higher level of achievement

compared with students studying under traditional instruction.
This gain is attributed to the better match that this system
achieves between the curriculum and the student's knowledge,
needs, and interests. Nevertheless, measures of academic
achievement alone provide no information about the degree to
which instructional procedures adjust to individual differences
which are expressed in actual classroom behavior.

In this study, it was first assumed that in an adaptive
system of education, individual differences along cognitive and
noncognitive dimensions could freely develop. The IPI system is
not a full range "open" system since children have to follow a
prescribed order of learning units. Nevertheless, the fact
that children can complete the units at their own pace, and the
fact that they do not behave in a permanent teacher-controlled
situation (as in the traditional classroom), make IPI open
enough to allow for individual differences to be expressed.

Secondly, it was assumed that if individual differences
are actually expressed, it should be possible to detect them
by, for example, observational methods. These observational
methods may show how different kinds of students behave and how
they interact with their peers, teachers, and other factors
in the educational setting.

The question remains as to what aspects of behavior best
i 'icate adaptability. It was assumed in this study that:

1. Adaptability of the curriculum to individual
    differences can be detected by measuring the students'

on-task/off-task behavior. If the curriculum is well matched to individual differences (by the curriculum builder and by the classroom teacher), slow and fast students should not differ in the amount of time they spend in on-task behavior, be that prescribed, mutually agreed upon with the teacher, or self-initiated task.

2. Adaptability of the teacher to individual needs can be detected from measurement of the number of teacher/student interactions. The circumstances under which these inter-tions task place, (e.g., on-task or off-task) is also important. In general, it is assumed that there should not be a difference in the availability of the teacher to either slow or fast students. Occasionally, however, when there is an apparent need to compensate for a disability evidenced in the learning progress of slow students, it is expected that the teacher will initiate encounters with the slow student in order to increase learning and to provide more emotional support and reinforcement.

Considering the assumptions made above, it can be seen that characteristics of adaptability can be defined as combinations of two dimensions: the task-related dimension and the interpersonal dimension.

Three possible kinds of task-related learning were defined: Direct on-task behavior, task-oriented behavior, and off-task behavior. Direct on-task behaviors included activities in which the student seemed to be occupied by his

tasks, (e.g., reading, writing, game playing, counting). In the task-oriented category were activities closely related to on-task behavior even if they could not be considered as direct on-task behavior, (e.g., waiting, arranging an assignment). Such activities could indicate learning tendency or motivation. Activities which no relation to task performance was apparent were included in the off-task category.

The second behavioral dimension specified the types of behavior engaged in by the student while performing direct on-task, task-oriented, and off-task activities. Three types were defined: no interpersonal interactions, dyadic interactions (student/student, student/teacher), and group interactions.

These two dimensions were combined into a matrix, from which categories of observed behavior were derived (see Figure 1). Not all cells of the matrix were measured, however, since not all combinations of behavior can occur under the IPI system.

Subjects

The subjects for this pilot study were eight second-grade students from the Frick School, an inner-city school that is associated with the Learning Research and Development Center. Four of the students had mastered the largest number of curricular units and were thus classified as "fast." The other four had mastered the least number of units and were designated as "slow."

Apparatus

In order to record the different amounts of time spent in each category of behavior, a graphical recording device with a remote control button box was employed. This device enabled the observer to position himself at any point in the classroom.

Procedure

The observations in this pilot study took place in the winter of 1972 in one of the second-grade classrooms within the Frick School. There were 20 students in this classroom. Observations were taken during the morning hours (from 9:30 to 11:30). During these periods, one teacher or aide was "traveling" among the students tutoring those who requested help, while the other provided assistance to a student or groups of students for more extended periods of time. Half of the students in the class worked on math projects and the other half on reading. The next morning those who worked on math worked on reading and vice versa. Curricular units were shelved along the walls and all the students were skillful enough so they could independently walk to the shelves and pick up the appropriate task. They also knew how to arrange the materials for learning, to reorganize them after they were through, and to reshelve the units so they were available to others.

Only one student was observed at a time. Each student was observed five times during the study. The percentages of agreement between the two observers were checked with the aid

of videotape equipment and found to be between 85 and 91 percent.
In order to control for subject-matter effect, observations were
made in equal number of times when the students were studying
math and reading. Similarly, the effect of a particular teacher
was also controlled. (Two persons, as it is explained above,
were guiding students -- the main teacher and the aide, although
only one was in contact with the student at a time).

Results and Discussion

The results presented below concentrate on: (1) character-
istics of slow and fast students when they worked individually,
(2) characteristics of student/teacher interactions of slow and
fast students, and (3) characteristics of the peer interactions
of slow and fast students.

Individual Domain

Tables 1 and 2 show the results in those categories in which
the individual does not interact with either peers or a teacher.
On the average, the fast student spent twice as much time working
on his assignment than the slow one. The number of occurrences of
on-task behaviors, however, was about the same. The percentage of
time spent in direct off-task behavior by slow students was twice
that spent by the fast ones. Both the slow and the fast students
spent about the same amount of time in arranging assignments. The
number of waiting occurrences was significantly higher for fast
students.

As noted above, the fast student worked more and idled less than the slow one. If our first assumption, that curriculum adaptability can be detected from measures of on-task behavior, is correct, this result indicates that the present curriculum is not equally adaptive to the entire range of individual differences. The term curriculum is used here in its broadest sense. It is not just the instructional unit, but also the kind of the decision which was made by the teacher to present a specific curriculum unit to a particular student. If it can be assumed that the teacher generally made the right decisions within the context of what could possible be done, curriculum developers should then recognize the limits of the present curriculum to attract and hold the attention of different students.

In any case, it seems that it is not the theory of the "proper match" but rather the actual present attempt to approximate that match with a wide range of individual differences which needs to be reconsidered. Several reasons can account for this situation. Among these are: (1) some students (slow ones) require more gradual sequencing; (2) some prerequisites for achieving the tasks may not be priorly obtained; (3) differences in interests are not met by the present curriculum, and (4) available curriculum units are not varied enough to equally attract all students.

The fact that both the slow and the fast students spent about the same percentage of time in arranging assignments may indicate that this amount (around 14 percent) is a character-

istic of the IPI procedure rather than a difference between slow and fast students. Interestingly, with regard to this category, the standard deviation among the slow students was three times higher than that among the fast ones. It should be remembered that slow students have, in fact, less cause for spending time in arranging assignments since they master less units in a period of time. Therefore, it seems that being busy with arrangements may have more than one purpose for some of the slow students. Perhaps making arrangements becomes an end by itself, or, perhaps, some of the slow students are hampered by arranging assignments.

With regard to "waiting" time, the difference found between slow and fast students was in the number of occurrences of waiting behavior (but not the total amount of time). This difference is not surprising if one remembers that fast students master more units, and that any progress to a new unit must be approved by the teacher. Moreover, the fast students not only master more units, they also face more points of novelty and difficulty, they probably are less hesitant in requesting help from the teacher, and they are more oriented toward academic achievement. It thus seems that one should expect the fast students to have many more reasons for waiting behavior.

Student/Teacher Interactions

The time spent in the category called "given general attention" was less than 1 percent in the behavior of both slow and fast students, and thus is not indicated in the tables.

The infrequent occurrence of this behavior may indicate that
disciplinary comments were uncommon in this particular class-
room. This finding is in accordance with the general belief that
in _individualized instruction_, in which every pupil is free to
work at his own pace, the need to control or to discipline
students is minimal.[4]

The number of occurrences of student/teacher interactions
which concerned on-task activity was significantly higher with
regard to the fast students, compared with the slow ones. (See
Table 3). This finding is, apparently, a result of the pre-
viously mentioned higher rate of "waiting" frequencies among
fast students. If this analysis is correct, it can be said that
teacher behavior in this classroom is in accordance with the
principles of adaptive education, i.e., the teacher is respon-
sive to the apparent needs of help. There are, however, two
points of concern. First, if teacher behavior is a simple
function of students' requests, the teacher, then, does not
initiate interactions with slow students who may otherwise not
request help. There is some evidence (Klein, Roden, Gentile,
Resnick, Reynolds and Bachmeyer, 1972) that increasing the number

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[4]There is, however, another aspect to this question. That
is, should the teacher spend time in teacher/student interac-
tions of the type that does not concern either academic on-
task behavior or disciplinary problems? That depends on the
type of relationship (student/teacher) one wants to have in an
educational setting. This aspect regards the general philos-
ophy of the educators who are involved in the implementation
of individualized instruction, and cannot be pursued further here.

of encounters between teachers and slow students results in
higher on-task behavior. Such an encounter probably has an
important reward effect on the student.

Secondly, as might be otherwise predicted, there is no evi-
dence from the data gathered in this study of teacher's favoring
particular kinds of students. The fact that fast students had
significantly higher frequencies of teacher guidance can be ex-
plained, as indicated above, by teachers' responsiveness to the
greater number of requests for help from the fast students. In
the psychological literature, as the reader may recall, some psy-
chologists have asserted that favoritism does exist. For ex-
ample, Rosenthal and Jacobson (1968) and Good and Brophy (1969)
claimed that teachers; expectations for student performance
function as self-fulfilling prophecies, such that positive
teacher expectations tend to increase student performance.
Good and Brophy found in the traditional classroom "pro-active
teacher behavior that goes beyond the objective differences
among the children and suggest that teachers may be enhancing
these differences rather than reducing them through compensation
technique." Again, even though this study did not concentrate on
this particular question, the evidence gathered can not sub-
stantiate a claim of teachers' favoritism.

Student/Student Interactions

The remarkable finding in this domain is that occurrences
were recorded in the "dialogue with neighbor" category in the
off-task dimension (see Table 4), but almost no peer activity

was recorded in the on-task categories ("help other student" and "guided by student"). Apparently, the IPI system has not yet made (at least in this particular classroom) provisions for peer learning and peer tutoring whereby students can help each other or cooperate in a common learning task.

Nevertheless, both slow and fast students spent about the same amount of time in dialogues of the off-task kind (between 10 to 15% of their time). This is not a negligible amount of time and might indicate a real need for social interaction, a need that does not change drastically even among academically motivated students. It might be helpful, therefore, to channel some of these social interactions into the learning on-task domains.

Group Activity

The degrees of social activity (see Table 5) which involved more than simple dialogue was very low for both fast and slow students. The total percentage of time spent in this activity was around 1 percent. On the average, the number of occurrences in 20 minutes of observation was less than 1, and there were no significant differences between slow and fast students in this respect. There are two possible explanations. First, more social activity goes on in the classroom in the afternoon than in the morning, when the observations were made. Secondly, math and reading are the only subjects studied totally on an individual basis.

Summary and Educational Implications

It appears that the observational system employed in this pilot study is sensitive to individual differences, since the results clearly show two distinct patterns of behavior for slow and fast students. These findings permit discussion about the way the educational system adapts itse.. to some aspects of individual differences.

It is often asked how to explain the slow progress of some students: Is it because the slow student works slowly or because he simply works less? A major finding of this study clearly indicates that much of the variance in the behavior of slow and fast students can be attributed to the fact that the slow students spend less of their time in on-task activities. If this finding is universally true, it should be faced by curriculum developers, instructional designers, and all others for whom adaptive education is a major concern. The display of curriculum of adaptive education (see Resnick, 1972) should vary in such a way that all kinds of students may find it highly attractive.

In the classroom observed in this study, much of the control of the teachers' time was left to the students themselves. In such a situation, the fast students will always gain more encounters with the teacher. If adaptive education is also to be compensatory for those who come to the school with obvious disadvantages, one would expect teachers to plan their activities in such a way that interactions with slow students will not depend on student initiative alone. Perhaps one way of

achieving this would be to provide the type of data gathered in this study to teachers so that they can plan the distribu- tion of their time in a manner which is more sensitive to individual needs.

Since the findings of this study showed that the fast student worked longer, idled less, and received the teachers' help more frequently, one may conclude that the system favors the fast student. Nonetheless, it should be remembered that the production of the fast student, in terms of the number of units mastered, is found on the average to he three times higher than that of the slow one. Hence, if the total amount of time spent in each category is divided by the number of units mastered during the period of observation, every difference found in the study will simply change its direction. That is, when total amount of time spent in each category is divided by the number of units mastered in this same time, the fast student appears to spend relatively less time in on-task behavior in terms of time-per-unit, and has the teachers' guidance less frequently. What emerges from this analysis is that in terms of educational "cost", the slow student is much more costly to the system. Consequently, it might be said that the IPI system (as well as many others) invests more in the education of the slow student than the fast one. Whether or not the right proportion of time is invested in the slow or the fast students is, however, a matter for society to decide.

And, finally, the IPI system, as many other early educa- tion projects, has a generally high adult-to-student rate.

Yet, even this high ratio cannot satisfy the students' demand
for teacher guidance. Both slow and fast students spend about
10 percent of their time waiting for the teacher. They spend
more time in waiting than in being guided and the number of
times they indicate waiting is persistently higher than the
number of times they receive the teacher's attention. If there
is no way to increase the adult-to-student ratio, may be
alternatives ought to be considered, one of which is for the
students to help each other. Another way to solve the guiding
problem is to increase self-controlled tasks which presumably
(Wang, 1973) require less amount of teacher intervention, for
some of the students.

TABLE 1

Mean Percentage of Time Spent in Individual Activities

Activity	Slow Students*		Fast Students*		T Test
	Mean	S.D.	Mean	S.D.	(p. level)
On-Task	21.8	3.1	41.5	6.8	.005
Arrange Assignment	14.7	6.5	14.2	2.1	N.S.
Waiting for Test or Help	9.8	7.3	11.7	4.0	N.S.
Off-Task (sitting)	22.9	10.2	10.4	8.1	.10
Off-Task (moving in class)	3.7	3.0	1.1	0.5	.10

* Four slow students and four fast students were observed. Each student was observed five times during the year for a period of 20 minutes. Total time of observations on each student was 100 minutes.

TABLE 2

Mean Number of Occurrences of Individual Activities

Activity	Slow Students*		Fast Students*		T Test
	Mean	S.D.	Mean	S.D.	(p. level)
On-Task	8.7	2.2	8.9	2.0	N.S.
Arrange Assignment	.4.9	1.3	4.5	0.9	N.S.
Waiting for Test or Help	3.8	1.5	6.0	1.5	.05
Off-Task (sitting)	8.8	2.8	5.7	2.3	.10
Off-Task (moving in class)	2.0	1.3	0.7	0.3	.05

* Four slow students and four fast students were observed. Each student was observed five times during the year for a period of 20 minutes. Total time of observations on each student was 100 minutes.

TABLE 3

Mean Percentage of Time and Number of Occurrences of Student/Teacher Interactions

Activity	Slow Students*		Fast Students*		T Test
	Mean	S.D.	Mean	S.D.	(p. level)
Guided by the Teacher (total amount of time)	8.8	1.9	9.2	3.7	N.S.
Guided by the Teacher (number of occurrences)	2.9	0.4	3.6	0.3	.025

* Four slow students and four fast students were observed. Each student was observed five times during the year for a period of 20 minutes. Total time of observations on each student was 100 minutes.

TABLE 4

Mean Percentage of Time Spent in Peer Interactions

Activity	Slow Students*		Fast Students*		T Test (p. level)
	Mean	S.D.	Mean	S.D.	
Dialogue with Neighbor (off-task)	15.5	7.8	9.2	5.1	N.S.
Social Activity (off-task)	1.2	1.5	0.9	0.9	N.S.

TABLE 5

Mean Number of Occurrences of Peer Interactions

Activity	Slow Students*		Fast Students*		T Test (p. level)
	Mean	S.D.	Mean	S.D.	
Dialogue with Neighbor (off-task)	5.9	2.2	5.4	1.2	N.S.
Social Activity (off-task)	0.9	0.9	0.7	0.6	N.S.

* Four slow students and four fast students were observed. Each student was observed five times during the year for a period of 20 minutes. Total time of observations on each student was 100 minutes.

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INTERPERSONAL INTERACTIONS ←————————→

TASK RELATED INTERACTIONS

	DIRECT ON-TASK	TASK ORIENTED	OFF-TASK
No Interpersonal Interactions — Individual	Busy with Assignment	Arrange Assignments	Not Busy with Assignments
		Waiting for Test or Help	Moving Around
Dyadic Interactions — Student/Teacher	Guided by Teacher	General Instructions*	Given General Attention
Student/Student	Guided by Student	Help Other Student	
Group Interactions — Group	Share Common Task*	Common Arrangements*	Having Dialogue
	Share Common Task*	Common Arrangements*	Social Activity

*Not Recorded

Theoretical Structure of an On-Task Interpersonal Categorical System

FIGURE 1

APPENDIX

.

The Educational Model of IPI and PEP

History of IPI and PEP

Individually Prescribed Instruction (IPI) is an educa-
tional system designed by the Learning Research and Develop-
ment Center of the University of Pittsburgh. Implementation
of the new curriculum and instructional procedures started in
the Oakleaf Elementary School, in a suburb of Pittsburgh, in
1964. The Primary Education Project (PEP) was started in 1967
at Frick Elementary School, an inner-city school in Pittsburgh.
Both systems are closely related. Procedures and some units
of curriculum in PEP were initially borrowed from IPI. New
developments of curriculum and procedures will be finally
administered in both schools, depending on the particular
circumstances. The major aspect of differences between the
two schools today is in their management procedures; e.g.,
in PEP some attributes of the classroom as a group still
exist, this is not so in Oakleaf. For a detailed description
of the initial IPI see Lindvall and Bolvin (1966, 1967); for
a description of the PEP approach see Resnick (1967), Wang,
Resnick and Schuetz (1970). In this study, differences be-
tween PEP and IPI will be generally ignored.

Appendix Con't

Goals of IPI

The chief goal of the individualized instruction approach
is to make the educational system more responsive to individual
differences among students. This general goal derived in part
from the belief of western democratic society that individual
differences between persons (including students) are to be
respected. Organizations and institutions are thus expected
to achieve their goals while adapting their procedures, to a
certain degree, to their individual members. Special em-
phasis on such a demand was given by educators who were con-
cerned with the problems of compulsory education which is
expected to provide proper education for all. It was believed
(Glaser, 1972) that education can no longer play a selective
role, as it used to do; rather it should be adapted to the
individual's needs. In addition to that, the designers of
individualized instruction in LRDC (See Glaser, 1968; Resnick,
1967; Lindvall and Bolvin, 1967) believed that _individualized_
instruction also has educational, more specifically, _learning_
advantages. It was assumed that learning is, in the final
analysis, an individual process thus the best instruction is
the one which matches individual set of prior knowledge, needs
and interests, something that can not be done in traditional
group instruction. Better approximation of the instructional
procedures to each individual will result in a higher rate of
learning progress and an increase in positive attitudes toward
the school.

Appendix Con't

Instructional Procedures of IPI

As Bolvin and Glaser (1971) pointed out (following Cron-
bach, 1967), there is more than one procedure possible to adapt
the educational system to individuals. Two of these procedures
seem to best characterize the work of IPI:

1)   Establishing a minimum set of fixed goals for all,
with additional goals for some students, and providing
for varying techniques of instruction and varying times
to master the minimum set of fixed goals. Remedial
programs, certain tracking programs, and non-graded
programs attempt to employ this procedure.

2)   Establishing sets of goals and learning outcomes
with a variety of instructional techniques and resources,
with time to reach the desired competencies varying from
one student to another. In this situation, it is assumed
that goals may vary from student to student.

These general procedures will be discussed below with regard
to some particular aspects of the educational system.

A.   Curriculum development in LRDC makes use of a technique
called component analysis (following Resnick, 1967). In this
technique hierarchies of learning objectives are identified,
such that mastery of objectives lower in the hierarchy facil-
itates learning of higher objectives. In this way a line (or
a tree) of sequences is set as the skeleton of the curriculum.
Embedded tests in each particular sequence can allow observations
of the degree by which progress is achieved. Such informa-
tion is needed when a decision about how to continue learning
is made.

B.   The role of the teacher in IPI consists of three major
functions: evaluation, diagnosis and guidance.   The three
functions are actually inseparable since guidance is based on
diagnosis of difficulties and diagnosis can be done only on
the basis of some evaluations.   In order to implement this
function the teacher should be familiar with the curriculum
so that he can make the right assessments, give the best
guidance and make the right decisions about how to continue
learning.

    In this system much of the teacher's time is devoted
to tutoring individuals rather than to instructing groups.
This fact makes it possible for the teacher to adapt his
instruction to the needs of a particular individual and to
give him the special support he needs.

C.   The role of the student in IPI is to become a self-
motivated independent learner.   To achieve that the student
should obtain self-management skills which should enable
him to proceed in the curriculum according to his own pace,
to request teacher's help if such is needed, to search for
the information he needs, to order and to organize learning
materials.   (c.f. Glaser, 1972, p.11).

References

Bolvin, J. O., and Glaser, R. Individualized Instruction. In
D.W. Allen and E. Seifman (Eds.), The Teacher's Handbook.
Glenview, Illinois: Scott, Foresman, 1971. Pp. 270-279.

Cronbach, L. J. How Can Instruction Be Adapted to Individual
Differences? In R. M. Gagne (Ed.), Learning and Individual
Differences. Columbus, Ohio: Charles E. Merrill, 1967.
Pp. 23-39.

Glaser, R. Adapting the Elementary School Curriculum to Indi-
vidual Performance. In Proceedings of the Invitational
Conference on Testing Problems. Princeton, New Jersey:
Educational Testing Service, 1968. Pp. 3-36.

Glaser, R. Individuals and Learning: The New Aptitudes. Ed-
cational Researcher, 1972, 1 (6), Pp. 5-13.

Good, T. L., and Brophy, J. E. Analysis Classroom Interaction.
Austin, Texas: University of Texas, 1969. (Reprint Series
Number 26).

Klein, R. D., Roden, A. H., Gentile J. R., Resnick L. B., Reynolds
L. J., and Bachmeyer B. The Effects of a Systematic Mani-
pulation of Contingencies Upon Overt Work Behavior in a
Primary Classroom. Pittsburgh: University of Pittsburgh,
Learning Research and Development Center, 1972. (Publica-
tion 1972/16).

Lindvall, C. M., and Bolvin, J. O. The Project for Individually
Prescribed Instruction. (The Oakleaf Project). Pittsburgh:
University of Pittsburgh, Learning Research and Development
Center, 1966. (Working Paper 8).

Lindvall, C. M., and Bolvin, J. O. Programmed Instruction in the
Schools: An Application of Programming Principles in "In-
dividually Prescribed Instruction." Sixty-sixth Yearbook
of the National Society for the Study of Education, Part
II. Chicago: NSSE, 1967. Pp. 217-254.

Resnick, L. B. Design of an Early Learning Curriculum. Pitts-
burgh: University of Pittsburgh, Learning Research and
Development Center, 1967. (Working Paper 16).

Resnick, L. B. Open Education: Some Tasks for Technology.
Educational Technology, 1972, 12 (1), Pp. 70-76.

References con't

Rosenthal, R., and Jacobson, L. Pygmalion in the Classroom.
    New York: Holt, Rinehart and Winston, 1968.

Wang, M. C., Resnick, L. B., and Schuetz, P. A. PEP in the
    Frick Elementary School: Interim Evaluation Report of the
    Primary Educational Project, 1968-1969. Pittsburgh:
    University of Pittsburgh, Learning Research and Develop-
    ment Center, 1970. (Working Paper 57).