Teacher Proximity as an Instructional Variable in the Use of Interactive Video

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TEACHER PROXIMITY AS AN INSTRUCTIONAL VARIABLE
IN THE USE OF INTERACTIVE VIDEO

by

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Teacher proximity during the use of the video disc *Mastering Fractions* produced by Systems Impact (1984) was investigated for effects on student on-task behavior. The study used a randomized multi-element design and was implemented in two classrooms at the junior high school level. In Phase 1, the 12 subjects were enrolled in a regular education mathematics classroom. The seven students in Phase 2 were enrolled in a special education classroom in the same school. During both phases, students were observed during teacher proximity and non-proximity conditions. Results of the study indicate no observable difference in student attending behavior when comparing proximity and non-proximity conditions.
ACKNOWLEDGEMENTS

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Rosalie L. Kirsch
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CHAPTER I

INTRODUCTION

Over the years, many suggestions have been made for improving education. Skinner (1984) identified a variety of variables that educators believe would improve the quality of education. Some believe that we must pay teachers more, possibly according to a merit plan. Others focus on revisions in teacher preparation and propose that teachers teach subjects only in areas in which they are certified. Still others favor extending the school day from six to seven hours or lengthening the school year from 180 to 200, possibly to 220 days. Some critics have suggested changing what teachers teach, emphasizing a "back to basics" approach to schooling. It is interesting to note that improving teaching skills is seldom mentioned as a viable option for improving education. One might determine the nature of national concerns with education by observing issues presented in public media, such as the New York Times which periodically publishes surveys of educational issues. Three such surveys by Fisk (1982), (1983a), (1983b) contained 18 articles about the content of classes, 11 articles

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about the special needs of students, and a smaller number of articles about miscellaneous school issues. Of approximately 70 articles, only two addressed how students were taught (Skinner, 1984).

Issues regarding teaching methodology and/or teaching strategies, although frequently a topic of discussion within teaching training programs, are seldom part of serious public comment. This may be partly due to the practice of allowing and/or expecting that teachers will conduct their classes in a "professional manner" in an atmosphere of "academic freedom." This concept and practice, while critical for facilitating freedom of expression within the confines of the classroom also may be interpreted to mean that the classroom is a "private" place for only teachers and students. Only within the last few years has a review or evaluation of individual teacher's procedures been given serious attention.

One movement within education, Direct Instruction (DI), has focused on teaching strategies as an integral part of school curricula. The DI instructional package includes the content to be taught, clear and precise instructional procedures and a management plan for use in delivering instruction. In short, DI is an educational curriculum that attempts to improve how teachers teach in the classroom (Carnine & Silbert, 1979). Direct Instruc-
tion refers to a program with "high levels of student engagement within academically focused teacher directed classrooms using sequenced structured materials" (Rosenshine, 1978, p. 46). The basic principles of this model share many features with so-called "behavioral approaches" to education which are frequently used in special education classrooms. Because of the types of challenges in these classrooms, emphasis is on the use of highly-structured curriculum materials involving basic learning procedures such as modeling, shaping of desired responses, reinforcement of appropriate behaviors, the use of task analysis and constant assessment of student performance. There are, however, distinguishing features that differentiate Direct Instruction from other behavioral approaches. These include: (a) the explicit teaching of "general case" problem solving strategies, (b) an emphasis on small group instruction vs. students working alone, (c) a systematic technology for correction of errors, (d) emphasis on cumulative review of previously learned material, and (e) insistence on mastery of each step in the learning process (Gersten, Carnine, & Woodward, 1987). The basic tenets of Direct Instruction are relatively simple: all students can learn to the best of their ability, curricular materials are well designed, and teacher presentation for these materials is clear and consistent.
Research on DI began in the mid 1960s with the publication of Bereiter and Engelmann's (1966) *Teaching Disadvantaged Children in the Preschool*. The approach advocated by the authors was new and controversial. Engelmann believed that developmental levels, temperament and inner workings of the mind of the low achieving student were less important than the instructional sequences used to teach these students. The first decade of research on DI focused on demonstrating that the model was effective. Much of the early research was conducted in "Project Follow Through," a U.S. Office of Education research project aimed at improving school achievement of low-income students in 20 different communities throughout the U.S. Project Follow Through provided a comparison of eight teaching models for teaching disadvantaged children. The eight models of instruction were: Open Classroom, Cognitively-Oriented Curriculum, Bank Street Early Childhood Education, Responsive Education, Tucson Early Education, Parent Education, Language Development, Behavior Analysis and Direct Instruction. The independent evaluation in Follow Through (Stebbins, St. Pierre, Proper, Anderson, & Cerva, 1977) showed that students in DI made substantially greater progress than students in the other instructional programs, as measured by standardized tests.

With the results of project Follow Through and other
research documenting the effectiveness of DI with special education students, one might assume that DI programs would flourish (Gersten et al., 1987); however, this was not the case. Gersten et al. stated that from the outset, DI was, and still is, a controversial approach to teaching. They identified common concerns of educators using the DI curriculum. Some argue that its scripted lessons stifle student and teacher creativity. Others contend that the curriculum is too demanding, because considerable time and effort must be expended in order to teach with the program correctly. Other arguments used by some opposed to DI contend that too much effort is involved in simply presenting lessons correctly (Gersten et al., 1987). All DI programs require teachers to be actively involved in all phases of the instruction, i.e., presentation of a lesson, checking student progress, and supervising student seatwork. This approach typically takes considerably more time and effort for instruction than many educators feel necessary or are willing to give. Consequently, use of the DI programs has not been widespread in U.S. education (Carnine & Silbert, 1979).

Currently, research is underway to explore the possibility of using technology to help teachers to implement more difficult aspects of DI (Gerstein et al., 1987). One example involves an interactive video disc presentation based on the principles of DI. Interactive video
combines computer assisted instruction and educational television. It has been defined as "a system of communication in which recorded video information is presented under computer control to active 'users,' who not only see and hear the pictures, words, and sounds, but also make choices affecting the pace and sequence of the presentation" (Hoekema, 1983, p. 4). Videodiscs are designed for individual or whole class use. A 21-inch or 23-inch monitor is typically used, together with a laser-vision videodisc player. Access to the videodisc is usually provided by the teacher through a remote control key pad.

Much of the research conducted on interactive video has been done in the private sector and the military. Meyer (1984) reported that U.S. military personnel using the interactive video, received effective simulation training that was more cost effective than hands-on training. As a result, the U.S. Department of Defense has selected interactive video as its preferred medium for training delivery for military personnel. Major corporations such as Ford, General Motors, and Sears have also reported success using interactive videos for training technical and sales personnel (Hosie, 1987). Bosco (1986) published a comprehensive summary of empirical evaluations of interactive video for instruction. Of the 28 reports included, 16 reviewed the use of interactive
video in education, eight in school settings and the remainder in military training programs. Results of his analysis indicated generally positive results in both training time efficiency and attitude of users.

The Alaskan Department of Education also has conducted a comprehensive feasibility study of using interactive video in public education. A report (Hiscox, 1983) presented by the Alaskan Innovative Technology Project endorsed interactive video as a replacement for more traditional films and slides in the classroom. All of the above studies clearly showed that interactive video technology could be used effectively in educational and training settings. Despite initial enthusiasm, Hannafin (1985) encourages continuing empirical research of the efficacy of interactive video in all educational settings. Supporters of interactive video believe that in general, the technology is superior to traditional teacher-directed instruction because it forces the student to be an active participant in learning. They maintain that the learner will stay on-task longer and will achieve higher levels of performance as a result of increase in active participation (Lloyd & Loper, 1986).

Interactive video technology (IVT) has attracted the attention of researchers investigating its use in teaching mathematics. A severe shortage of qualified mathematics teachers at the secondary level has made the
potential use of interactive video even more attractive. Many mathematics teachers are faced with large classes which limits opportunities to provide the individualized instruction needed by many students. Interest in IVT is being further stimulated by general questions about the adequacy of typical mathematics curricula. A report from the National Council of Teachers of Mathematics (Carpenter, Coburn, Reys, & Wilson, 1976) identified a number of problems with the way fractions were taught in conventional curricula. More recently Kelly, Carnine, Gersten and Grossen (1986) reported that "the California Department of Education declared that all 14 of the major textbooks available for general use were deficient in their treatment of fractions, decimals, and problem solving" (p. 6). Thus, while IVT could provide the vehicle for delivery of instruction, curricular changes may be necessary for improvement in better teaching of math skills. Clark expressed this well in his 1983 article in which he argued that instructional technologies are "mere vehicles that deliver instruction but do not influence student achievement any more than the truck that delivers our groceries causes change in our nutrition" (Clark, p. 445). He recommended that research focus on curricular design rather than medium of delivery. Clark maintained that effective curriculum design is necessary for optimal student learning. Regardless of the reason, math compe-
tencies for U.S. students appear to need much improve-
ment. The National Assessment of Educational Progress
pointed out that nationally, "performance of fractions
computation is low, and students seem to have done their
computation with little understanding" (Lindquist, Car-
penter, Silver, & Matthews, 1983, p. 16). Further as-
essment revealed that only one-third of the seventh
graders surveyed could add 1/2 and 1/3.

Based on the need for more effective math instruction
and the apparent effectiveness of IVT, combining an
effective math curriculum and IVT seems to be a logical
step. This was realized in 1986 when Systems Impact,
Inc. published the Concepts in Science series which
included the Mastering Fractions programs (Systems Im-
pact, 1986). All of these programs were developed using
the principles of DI (Engelmann & Carnine, 1982). The
programs were designed to replace conventional texts by
providing videodisc presentations that illustrated and
reinforced basic concepts, while offering guided practice
on important skills. Mastering Fractions also includes
remedial exercises for each lesson, quizzes, on-screen
teacher prompts and student performance assessment
through frequent cumulative tests. Three general compo-
nents of DI (organization, program design, and material
presentation) are carefully integrated into the design
and development of the videodisc program.
Scheduling and use of the program in an effective manner remains the responsibility of the classroom teacher; however, the Mastering Fractions teacher's program booklet includes a detailed description of appropriate implementation procedures. By using this program, the teacher becomes less of a "presenter of instruction" and more of a manager and diagnostician. This aspect alone provides IVT with stability and fidelity of construction and may make it worth careful consideration for classroom use.

Peterson, Hofmeister and Lubke (1988, p. 17) also presented a major advantage of videodisc instruction in the classroom. They maintained that the use of video resulted in a substantial decrease in the amount of time a teacher spends at the chalkboard which could "easily double the amount of time they had to spend on the floor for monitoring, praising, helping and supporting students." Straker (1988, p. 204) noted, however, that,

In no way does this reduce the need for an effective practitioner to be present: in many respects, direct instruction through the medium of videodisc places greater, albeit different, demands on the class teacher. Teachers need to spend much more time and energy assisting individual pupils, and are constantly required to make decisions about the need to progress to the next section or to review a section where pupils experienced difficulties (p. 203).

Straker interviewed a group of students who had just completed a set of mathematics videodisc lessons and found the students felt that while the video disc materi-
al was good, it could not totally compensate for a weak teacher. The author also reported some difficulties with student cooperation. In one class, older students were reluctant to engage in public responding with their younger peers.

Previous research clearly supports the importance of certain teacher behaviors on student performance during delivery of instruction. DI has emphasized these variables even more. Teacher behaviors that have been identified as important are: signaling, pacing, monitoring, correcting, and praising.

Many educators also believe that physical proximity is important in facilitating students' success in that it helps keep students on task. Teacher proximity to the students being taught also is believed to improve the level of instructional control in the classroom. Minner and Prater (1989) pointed out that a teacher's presence can serve as a cue for a student to stop inappropriate behavior, to finish an assignment, or to attend to directions. Long and Newman (1961, p. 48) stated, "Every teacher knows how effective it is to stand near a child who is having some difficulty." Glass, Christiansen, and Christiansen (1982) maintain that proximity control is one of the most common and easily implemented techniques for reducing disruptive behavior.

Although it is frequently used by many teachers, few
researchers have systematically studied the effectiveness of teacher proximity on student classroom behavior. Since one of the main effects of proximity appears to be increased on-task behavior, this may be a critical teacher variable (Lloyd & Loper, 1986). An increase of students' on-task behavior also is one of the main objectives of the DI curriculum (Carnine & Silbert, 1979). Few studies have reported the effects of interactive video on user on-task behavior. Only Hull (1984) observed user-perceived attention. This unpublished article described no "reported benefit" of on-task behavior for military persons who were trained with interactive video (Shira, 1988).

The purpose of this study is to add to existing research data by investigating the effects of teacher proximity on student on-task behavior during the Mastering Fractions video disc presentation. The research will determine if teacher proximity to students during a video disc presentation is indeed an important teacher behavior for determining optimal student performance.
CHAPTER II

METHOD

Subjects

Students and teachers from two math classes participated in this study. The teacher in the first classroom (Phase 1) was a 35-year-old female regular education-math teacher who had five years of teaching experience. Of the 30 students in Phase 2, 13 subjects were randomly selected for inclusion in the study.

In the second classroom (Phase 2) the teacher was a 37-year-old female with 11 years of special education teaching experience. The seven subjects in this classroom were seventh and eighth grade students who had been previously identified as having a Specific Learning Disability in mathematics. All seven students participated in the study.

The students were chosen for this study because they were in classrooms where the teacher was beginning the use of the videodisc math program, Mastering Fractions, by Systems Impact (1984).
Setting

The students in this study attended an urban middle school comprised of varied ethnic groups of students and teachers. Both classroom teachers reviewed the prerequisite skills of addition, subtraction, multiplication and division, with the class before beginning the fractions videodisc program. Observations took place during the student's regularly scheduled math classes. The building principal was informed of the project and was supportive of the activity. During the project, a class-wide reinforcement system was in effect in the special education classroom to help with student motivation.

Apparatus/Materials

The laser disc, *Mastering Fractions*, instructional program by Systems Impact (1984) was used in the study. A laser disc player, remote control pad, and a T.V. monitor were used for the presentation of the videodisc material. A tape recorder was used to signal the observers when to observe a particular student.

Dependent Variable

The dependent variable for this study was student on-task behavior. On-task behavior was defined as:

1. Oral responding to the questions asked by the
classroom teacher or the video presentation.

2. Eyes directed toward the T.V. monitor, task material, or teacher, as appropriate.

3. Written responses to instructions presented by the video or classroom teacher.

Observation and Scoring Procedures

The students were observed individually during the presentation of the videodisc lesson. Each daily observation began when the teacher turned the classroom lights off and activated the videodisc system. The observation ended when the teacher turned the lights on in the classroom.

A time sampling procedure was used to record the on-task behavior of students in the classroom. The experimenters observed each student for two seconds with observations rotating sequentially across students every five seconds. If a student exhibited any of the three appropriate on-task behaviors during the two-second observation, it was recorded as a "+." If the student did not demonstrate any of the on-task behaviors, the observation interval was recorded as a "0." The observers used a tape recorder to determine the end of each interval. The tape announced a number at the end of each five-second interval which corresponded with a student in the class-
room. This number served as a cue for the observer to move to that student and observe his/her on-task behavior.

The observer sat at the front of the room facing the students. When reliability data were collected, the observers sat next to each other while listening to the same interval tape through separate earphones.

Observers were graduate students in psychology at Western Michigan University. Observer training consisted of the experimenter meeting with the second observer to provide a detailed definition of on-task behavior. Before the study began, both observers practiced recording on-task behavior. The results of these observations were reviewed and additional instruction was conducted until a 95% criterion for agreement was reached.

Reliability data were obtained by the second observer for 25% of the daily observations. Percent agreement was determined by dividing the number of agreements by the number of disagreements and then multiplying the fraction by 100.

Independent Variable

The independent variable for this study was teacher proximity to students. The proximity condition was defined as the teacher moving among the students while
controlling the videodisc presentation using the remote control pad. She remained in no particular area for more than three minutes. Although the teacher was not close to every student during this condition, moving about the class was defined as proximity since the teacher was in a position to be near any student in the class in a short period of time on an unpredictable basis.

During the non-proximity condition, the teacher remained at the back side of the class while presenting the videodisc lesson with the remote control pad. She remained in that same area of the room during the non-proximity condition. There were two situations during which the teacher was allowed to leave the area during the non-proximity condition. The first situation was when the prompt CSP (check student problem) was presented on the video screen. This prompt cued the teacher to check student's written work. The observers did not record student behavior during this time. Observations were resumed when the teacher returned to the non-proximity area. The second instance in which the teacher left the non-proximity area was to use the blackboard at the front of the room for illustrating a concept taught by the videodisc. The observers did record student behavior during those times. During the proximity and non-proximity conditions (independent variable), students were
observed to determine the amount of time they spent on task (dependent variable). Observations and measurement procedures were identical for both of these phases.

The conditions of the study could readily be differentiated from one another. When the teacher controlled the videodisc presentation while moving among the students, the proximity condition was in effect; when the teacher controlled the presentation from the predetermined area at the side of the room, the non-proximity condition existed.

Prior to beginning the videodisc, the students were informed that they were going to be using a video program to learn fractions. They were instructed to follow the directions of the videodisc as if they were being taught by the teacher in the classroom. They were also reminded that the teacher would remain in the classroom and that she would be in control of the pace of presentation of the videodisc material. Students also were reminded that existing classroom rules remained in effect, and that the teacher would continue to note inappropriate behavior as usual.

The length of the study was determined by the number of lessons in the videodisc program. The study began during Lesson 1 and ended with Lesson 34, the final lesson in the program. A remedial loop was completed if
1/5 of the students failed to meet criterion for a particular lesson. The program is designed for delivery of one lesson per day, which was generally adhered to by the teacher.

Experimental Design

A randomized multi-element design was used for the study. Treatment effects were evaluated by randomly alternating the non-proximity condition with the proximity condition. The experimenter used the table of random numbers to determine when the conditions of the study would occur. Each condition remained in effect an entire class period once it was chosen by random selection.
CHAPTER III

RESULTS

The purpose of this study was to investigate the effects of teacher proximity on student on-task behavior during the Mastering Fractions video disc presentation.

In Phase 1, data were collected on 13 of the 30 regular education students in the classroom. Results for the group of 13 subjects, showing the mean percent of on-task behavior during instructional sessions are presented in Figure 1.

All Subjects

![Graph showing mean percent on-task behavior during proximity and non-proximity conditions](image)

Figure 1. Group Mean Percent On Task During Proximity and Non-Proximity Conditions Across Sessions: Phase 1.
Each point represents the group average for a daily observation. The ordinate shows the percent on task; sessions are presented on the abscissa. The range for the group of subjects in the proximity condition was 35.18 to 55.63% across sessions. The mean percent on task in the proximity condition was 45.60%. The range for the group of subjects in the non-proximity condition was 34 to 53.1% across sessions. The mean percent on task in the non-proximity condition was 46.98%. The difference in mean percent on task of all subjects between conditions was 1.38.

Table 1 shows the mean percent and range of on-task behavior for each subject during proximity and non-proximity conditions. Mean on-task behavior for individual subjects in the proximity condition ranged from 34.6% to 80.2%. During the non-proximity condition the range was from 31.15% to 66.33%.

The difference between proximity and non-proximity conditions across all subjects ranged from .5% to 31.73%. Five of the 13 subjects (38%) had a difference of less than 5%. The data also show that 5 of 13 subjects (38%) performed better in the proximity condition. For these subjects the difference between conditions ranged from 4.17% (Subject 11) to 20.7% (Subject 2). For one subject (Subject 11) the difference was less than 5% but for the
Table 1
Mean Percent and Range On Task for Each Subject During Proximity and Non-Proximity: Phase 1

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Proximity Mean</th>
<th>Proximity Range</th>
<th>Non-Proximity Mean</th>
<th>Non-Proximity Range</th>
<th>Difference Between Condition Means</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>39.8%</td>
<td>20.1-66.0</td>
<td>65%</td>
<td>42.3-81.0</td>
<td>(25.7)</td>
</tr>
<tr>
<td>2</td>
<td>80.2%</td>
<td>86.0-66.8</td>
<td>59.5%</td>
<td>16.5-80.3</td>
<td>20.7</td>
</tr>
<tr>
<td>3</td>
<td>45.0%</td>
<td>27.0-77.1</td>
<td>46.8%</td>
<td>14.5-60.1</td>
<td>(1.8)</td>
</tr>
<tr>
<td>4</td>
<td>45.0%</td>
<td>30.0-60.5</td>
<td>30.2%</td>
<td>10.2-55.0</td>
<td>14.8</td>
</tr>
<tr>
<td>5</td>
<td>41.2%</td>
<td>16.1-50.0</td>
<td>46.6%</td>
<td>22.3-66.3</td>
<td>(5.4)</td>
</tr>
<tr>
<td>6</td>
<td>34.75%</td>
<td>16.1-50.0</td>
<td>37.33%</td>
<td>30.1-45.2</td>
<td>(2.58)</td>
</tr>
<tr>
<td>7</td>
<td>41.18%</td>
<td>18.5-60.2</td>
<td>31.15%</td>
<td>7.0-53.9</td>
<td>10.03</td>
</tr>
<tr>
<td>8</td>
<td>46.25%</td>
<td>22.0-70.2</td>
<td>47.0%</td>
<td>20.1-72.8</td>
<td>(.75)</td>
</tr>
<tr>
<td>9</td>
<td>34.6%</td>
<td>20.3-66.1</td>
<td>66.33%</td>
<td>44.1-100</td>
<td>(31.73)</td>
</tr>
<tr>
<td>10</td>
<td>43%</td>
<td>9.3-70.1</td>
<td>52%</td>
<td>40.2-76.1</td>
<td>(9.0)</td>
</tr>
<tr>
<td>11</td>
<td>45%</td>
<td>10.4-70.6</td>
<td>40.83%</td>
<td>16.1-60.2</td>
<td>4.17</td>
</tr>
<tr>
<td>12</td>
<td>52.8%</td>
<td>20.0-77.2</td>
<td>43.16%</td>
<td>16.1-60.2</td>
<td>9.64</td>
</tr>
<tr>
<td>13</td>
<td>43.5%</td>
<td>40.9-54.2</td>
<td>44.0%</td>
<td>16.0-63.3</td>
<td>(.50)</td>
</tr>
<tr>
<td>Total</td>
<td>45.60%</td>
<td>46.98%</td>
<td></td>
<td></td>
<td>(1.38)</td>
</tr>
</tbody>
</table>

Other four subjects the difference was 9% or more. Eight of the 13 subjects (62%) performed better in the non-proximity condition. Differences between conditions for these subjects ranged from .75% (Subject 8) to 31.73% (Subject 9).

These data indicate a preference for the non-proximity condition for 62% of the subjects; however, for half
of those subjects, the difference was less than 5\%. For three of the subjects, the difference was 9\% or more. The data also suggest variability both across subjects and within subjects.

The results of this study prompted the experimenter to question whether similar results would occur in other classrooms using the Mastering Fractions program. Phase 2 was an attempt to investigate this question.

In Phase 2, data were collected on all seven special education students in the classroom. Results for all of the seven subjects showing the mean percent of on-task behavior during instructional sessions are presented in Figure 2. Each point represents the group average for a daily observation. The ordinate shows the percent on-task; sessions are presented on the abscissa. The mean percent on task across all subjects in the proximity condition was 74.03\%. The average range for the group of subjects in the non-proximity condition was 60.23 to 81.03\% on task across sessions. The mean percent on task across all subjects in the non-proximity condition was 72.58\%. The difference in mean percent on task of all subjects between conditions was 1.45.

Table 2 shows the mean percent and range of on-task behavior for each subject during proximity and non-proximity conditions. Mean on-task behavior for individual
All Subjects

![Graph showing mean percent on-task over days for Proximity and Non-Proximity conditions](image)

**Figure 2.** Group Mean Percent On Task During Proximity and Non-Proximity Conditions Across Sessions: Phase 2.

**Table 2**

Mean Percent and Range On Task for Each Subject During Proximity and Non-Proximity: Phase 2

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Proximity Mean</th>
<th>Range</th>
<th>Non-Proximity Mean</th>
<th>Range</th>
<th>Difference Between Condition Means</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>70.17%</td>
<td>53.3-80.0</td>
<td>70.1%</td>
<td>54.0-87.0</td>
<td>.07</td>
</tr>
<tr>
<td>2</td>
<td>62.29%</td>
<td>41.1-86.0</td>
<td>60.23%</td>
<td>50.0-62.5</td>
<td>2.06</td>
</tr>
<tr>
<td>3</td>
<td>82.61%</td>
<td>72.4-94.0</td>
<td>81.02%</td>
<td>73.0-88.8</td>
<td>1.59</td>
</tr>
<tr>
<td>4</td>
<td>77.39%</td>
<td>53.8-86.6</td>
<td>80.11%</td>
<td>71.9-86.1</td>
<td>(2.72)</td>
</tr>
<tr>
<td>5</td>
<td>73.45%</td>
<td>53.3-85.0</td>
<td>71.19%</td>
<td>52.5-87.8</td>
<td>2.26</td>
</tr>
<tr>
<td>6</td>
<td>72.28%</td>
<td>62.5-91.1</td>
<td>74.68%</td>
<td>69.4-81.8</td>
<td>(2.40)</td>
</tr>
<tr>
<td>7</td>
<td>77.17%</td>
<td>52.6-93.3</td>
<td>73.53%</td>
<td>57.5-86.0</td>
<td>3.64</td>
</tr>
<tr>
<td>Total</td>
<td>73.62%</td>
<td>72.98%</td>
<td></td>
<td></td>
<td>.64</td>
</tr>
</tbody>
</table>

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subjects in the proximity condition ranged from 62.29 to 82.61%. During the non-proximity condition, the range was from 60.23 to 80.11%.

All of the seven subjects had a difference of less than 5% between proximity and non-proximity conditions. The difference between conditions across all subjects ranged from 0.07% to 3.64%. The data also show that five of seven subjects (71%) performed better in the proximity condition. For these subjects, the difference between conditions ranged from 0.07% (Subject 1) and 3.64% (Subject 7). Two of the seven subjects (29%) performed better in the non-proximity condition. Differences between conditions for these subjects were 2.4% (Subject 6) and 2.72% (Subject 4). These data indicate a preference for the proximity condition for 71% of the subjects; however, for all of the subjects, the difference was less than 5%. The data also suggest consistency across subjects and within subjects.

In Phase 1, 38% of the subjects show preference for the proximity condition, but for half of those subjects the difference between conditions was less than 5%. In Phase 2, 71% of the subjects showed preference for the proximity condition, but for all of those subjects the difference was less than 5%.

In Phase 2, there was less variability within and
across subjects, but the difference between conditions was consistent with Phase 1. Table 3 shows the mean difference in on-task behavior between proximity and non-proximity conditions in Phases 1 and 2.

Results from this study indicate that teacher proximity as a classroom management technique during the *Mastering Fractions* program had little effect on overall classroom on task behavior.

Table 3

<table>
<thead>
<tr>
<th>Phase</th>
<th>Mean Percent Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.38</td>
</tr>
<tr>
<td>2</td>
<td>0.64</td>
</tr>
</tbody>
</table>

Reliability

In Phase 1, the overall reliability coefficient for on-task behavior across all three sessions checked was 82. The range of the reliability coefficient was from 75 to 96.

In Phase 2, the overall reliability coefficient for on-task behavior across six sessions was 81. The range of the reliability coefficient was from 71 to 93.
CHAPTER IV

DISCUSSION

The results of this study indicate no difference in percent on task between proximity and non-proximity conditions. In Phase 1, the data show a mean average difference across conditions of 1.38%. Phase 2 demonstrated an average difference between proximity and non-proximity conditions as .64%.

Various researchers have reported that proximity control is an important component of effective classroom management. Minner and Prater (1989) maintained that a teacher's presence can be a cue for students to stop inappropriate behavior, to finish assignments, or to attend directions. Long and Newman (1961, p. 48) stated, "Every teacher knows how effective it is to stand near a child who is having some difficulty." Glass et al. (1982) believe that proximity control is one of the most common and easily implemented techniques for reducing disruptive behavior. Lloyd and Loper (1986) maintained that one of the main effects of proximity appears to be an increase in on-task behavior. They concluded that teacher proximity was a critical teacher variable.
The current data indicate that teacher proximity alone does not result in an increase in student on-task behavior when using the Mastering Fractions (Systems Impact, 1984) program. However, the results of the study did indicate that other teacher behaviors may result in an increase in student on-task behavior. Student on-task behavior in Phase 2 was significantly higher than on-task behavior in Phase 1. The mean on-task behavior for all subjects in Phase 1 was 46.29. The mean on-task behavior for all subjects in Phase 2 was 73.30. The results also show that there was greater variability of subject on-task behavior in Phase 1.

The differences in mean on-task behavior and subject variability may be attributed to class size. Phase 1 was conducted in a regular education classroom with a total of 30 students. Data for Phase 2 were collected in a special education classroom in which seven students were enrolled. It is possible that student on-task behavior increased and variability decreased when a smaller student to teacher ratio was in effect.

The difference in on-task behavior between both experiments could also be attributed to the interactions between the teacher and subjects during the video-disc presentations. The teacher in Phase 2 made many positive comments concerning the videodisc program. She also
developed an incentive program to increase student motivation. The incentive program used short-term and long-term, group, and individual incentives. Each day students were given points. The number of points distributed depended on their behavior and work habits for the day. Points were awarded for coming to class on time, being prepared to work, and on-task behavior. Students were allowed to "buy" items with their points each Friday. Optional time could also be earned. A favorite incentive for the students in this classroom was early dismissal for lunch. All of the students worked hard for this special privilege. In fact, they frequently monitored each other because the teacher released the class early only when the entire class earned the right to leave.

The teacher in Phase 1 did not make positive comments about the videodisc program. Many students in this classroom appeared disinterested, and complained about the lessons. Some students in the classroom had already been through the Mastering Fractions program, and did not feel that they needed the review. There were also no incentives in effect for students in this classroom.

One area of concern in this study was the definition of on-task behavior. An increase in student on-task behavior is one of the main objectives of the Direct
Instruction curriculum (Carnine & Silbert, 1979). However, on-task behavior can be difficult to define and observe. It was apparent that some students who appeared to be on-task during observations were participating in activities unrelated to the daily lesson. One subject in particular wrote notes to her friends during class. However, she appeared to be on-task by definition. Perhaps the use of video taping for the experimental sessions would provide the basis for correctly identifying on-and-off task behavior.

The findings of the present study suggest some interesting possibilities for future study. One study might compare proximity and non-proximity conditions in classrooms across a variety of teaching conditions such as independent work group activities and other DI programs. The role of age and grade level of students in determining the effectiveness of proximity control also should be investigated. To date there is little research on different age levels.

Another follow-up study might be to observe on-task behavior in students who are disruptive in the classroom. It would be interesting to determine if proximity control has a greater effect on "problem" students.

Finally, the effects of other classroom management strategies on on-task behavior should be investigated.
The current research indicates that teacher attitude and classroom incentive programs can result in increased student on-task behavior. Additional study in this area would add needed data to the current findings.


