REMEDIAL SUMMER SCHOOL: AN EFFECTIVE ALTERNATIVE TO RETENTION FOR SECONDARY MATHEMATICS STUDENTS?

by

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B.Ed., The University of British Columbia, 1983

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF

THE REQUIREMENTS FOR THE DEGREE OF

MASTER OF ARTS

in

THE FACULTY OF GRADUATE STUDIES

(Department of Curriculum Studies)

We accept this thesis as conforming

to the required standard

THE UNIVERSITY OF BRITISH COLUMBIA

March 1996

Department of CURRICULUM STUDIES

The University of British Columbia
Vancouver, Canada

Date MARCH 14, 1996

ABSTRACT

Students who fail a compulsory course at the secondary level are almost always required to repeat the course the following school year. The literature on retention, however, suggests that this is not a helpful practice. Remedial summer school is an alternative to retention for secondary students.

The purpose of the present study was to provide some evidence to support or refute the practice of remedial summer school as an alternative to retention for secondary mathematics students. The study examined the subsequent mathematics achievement of students who had receive incomplete marks in Mathematics 8 during the 1992-93 school year.

An *ex post facto* design was used to compare Mathematics 9 achievement among three groups of students who received incomplete marks in Mathematics 8. The original data analysis, based on dependent samples t-tests, was impossible to complete because of the small number that remained in the sample. However, non-parametric analyses using chi-square tests were conducted on the data and provided information useful to the purpose of the study.

For students who received incomplete marks in Mathematics 8, those who participated in summer school were more likely to continue to be enrolled in the district and enrolled in Mathematics 9 than those who did not participate in summer school. However, summer school was not related to passing marks in Mathematics 9. Fifty-five percent of the students who passed Mathematics 8 in summer school failed Mathematics 9 the next year. Participation in summer school did not enable most students to successfully complete Mathematics 8. Summer school may help keep students enrolled in the district and in the regular mathematics stream, but not help them pass Mathematics 9.

Recommendations for future practice include early identification of students' learning difficulties in order to provide appropriate remediation techniques and prevent failure. More extensive use of adaptive and modified curriculum as defined in *The Special*

Education Services Manual of Policies, Procedures and Guidelines (Ministry of Education, 1994) is recommended.

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ACKNOWLEDGMENTS

Thank you to the members of my committee, Dr. David Robitaille, Dr. Graham Kelsey, and Dr. James Sherrill. Your support and guidance along with your humour and sensitivity enabled me to complete a work I'd procrastinated about for some time. I especially appreciate the early morning meetings with Dr. Sherrill that allowed me to discuss my study without interfering with my work day. I saw a number of sunrises that I would've missed otherwise!

My husband, Andrew, has been my biggest supporter. Without his encouragement and patience I would have not have completed this thesis. His sometimes insistent prodding was necessary to get me going. Thank you. Thank you for the tea, too.

Chapter I

Nature of the Study

Background

The British Columbian public wants educational excellence and accountability in our school system (Ministry of Education, 1985). This has resulted in requests for "clearly defined goals ..., unambiguous standards, and systems to monitor pupil performance" (Marx and Grieve, 1988). In the United States, a parallel demand for minimum competency testing has filtered through the school system to manifest itself in the form of stricter grade-to-grade promotional standards (Shepard and Smith, 1989). Adherence to strict standards is supposed to improve the quality of education as students strive to achieve necessary skills and knowledge.

In practice, however, there will be students who, for a variety of reasons, fail to achieve the standards. This is not something new in education. Some students have failed to meet advancement criteria ever since schools have been structured into grades (Lenarduzzi and McLaughlin, 1990; Holmes and Matthews, 1984). "Failing, or flunking, is an accepted and expected factor of life in the school with a graded organization" (Tranter, 1991). Failure and repetition rates have varied in the past as "... schools have fluctuated in their attitudes toward such issues as social promotion and minimum competency tests, or more broadly, the importance of the academic versus all-round development of the individual child" (Byrnes and Yamamoto, 1986). Much like other issues in education, it seems as though a pendulum swings between bipolar practices: in this case, between retention (failure to advance to the next higher grade level) and social promotion (advancement to the next higher grade level without acquiring the grade level standards of the previous grade). Early in the century, the pendulum was firmly on the side of retention; beginning in the 1930s the pendulum swung back to the social promotion side; currently, the pendulum seems to be on its way back to retention (Johnson and

Immerwahr, 1994; Shepard and Smith, 1990; Rose, Medway, Cantrell and Marus, 1983; Miller, Frazier and Richey, 1980).

Social promotion, the practice of advancing students with their age cohort despite the fact that they have not met grade level standards, has been criticized and blamed for the current state of educational disarray (McLeskey and Grizzle, 1992; Rose, Medway, Cantrell, and Marus, 1983). In a report titled *Canada's Schools: Report Card for the 1990s,* it is noted that 34% of Canadians surveyed were dissatisfied with schools' performance in teaching reading, writing and speaking (Williams and Millinoff, 1990). Marx and Grieve (1988) note that 40% of the recommendations made to the Royal Commission on Education in British Columbia through submissions from the public concerned issues of standards and expectations for student performance. The attainment of standards is important to Canadians. Some claim that social promotion means lax standards and, ultimately, incompetent graduates (Shepard and Smith, 1989). Incompetent graduates lead to economic crisis as outlined in *A Nation at Risk*, an often cited reform report (National Commission on Excellence in Education, 1983).

The mission statement of British Columbia's schools emphasizes the importance of a healthy economy; attainment of a prosperous and sustainable economy is a prominent purpose of the school system. According to Harker (1992), social stability and economic prosperity are overriding themes of our education system. Williams and Millinoff (1990) report that 21% of Canadian's surveyed gave schools a failing grade for the preparation of students for the workforce. No breakdown was provided by province; however, the authors note that this finding was the most negative of all the data they collected. It appears that there is room for improvement with the public's perception of the effectiveness of schools for preparing students for the workforce.

The Intermediate Program Policy (Ministry of Education, 1993) states that the public school system in British Columbia is committed to high standards and that these standards should serve as the basis for instruction and assessment of students. Reference sets (samples of student work) are being compiled to illustrate for teachers what students are expected to learn at each grade level and with what degree of complexity. The policy document expresses a commitment that no student leave school without the knowledge and skills that are necessary for work, community life, or further learning (p. 7). This commitment is consistent with minimal competencies or exit standards for high school graduates although they do not come into play until grade 12.

Exit standards translate to promotional gates at earlier grade levels (Shepard and Smith, 1989). Promotional gates are simply grade level standards that students must attain before being admitted through the gate to the next higher grade. Teachers decide whether or not students have reached an achievement level sufficient to progress through the gate; they assess their students' attainment of grade level standards to determine if their students can advance to the next higher grade.

At the elementary level, the placement decision is momentous because it could result in repetition of a full year of school. At the secondary level, because advancement is by subject, placement decisions are of lesser magnitude. In both levels of schooling, if grade level standards are not met, teachers are faced with a difficult decision: social promotion or retention for their students. Some teachers choose promotion in the recognition that the social aspects of staying with one's peers are very important for students, more important than a review of the previous year's work in the hope that standards can be reached. Other teachers weigh social aspects and attainment of standards differently and choose retention. They believe that repetition will give students opportunities to improve skills, increase knowledge, and attain grade level standards. Retention is the major strategy used by teachers as a remedy for academic failure (Holmes, 1989).

Retention has been practiced for many years. However, its effectiveness is not supported by research evidence (Glickman, 1991; Graves, 1990; Holmes, 1989; Holmes and Matthew, 1984; Jackson, 1975) . In fact, the research indicates that not only do retained students not achieve grade level standards, they actually suffer emotionally and socially (Hagborg, Masella, Palladino, and Shepardson, 1991; Byrnes, 1989). Retention is a harmful practice; yet, it is supported by large numbers of teachers, administrators, and parents (Tomchin and Impara, 1992; Byrnes and Yamamoto, 1986). There is a disparity between practice and research as Glickman (1991) points out in an article titled "Pretending Not to Know What We Know".

Most of the research on retention has occurred at the elementary level, particularly in the primary grades. The majority of the research literature suggests that retention is bad practice (Tranter, 1991; Holmes, 1989; Germain and Merlo, 1985). At the secondary school level, because promotion is usually by subject rather than grade, students who fail to achieve advancement criteria in one subject are required to repeat only that subject and advance in the others. Little retention research exists at the secondary level (Safer, 1986); however, it could be argued that the same detrimental effects that are evident at the elementary level also exist at the secondary level, perhaps on a smaller scale, since repetition takes place to a smaller extent (Jackson, 1975). It seems probable that students repeating a single subject would still experience negative effects but to a lesser degree than elementary students repeating an entire grade. Secondary students who repeat would be with their age-appropriate peers for the majority of their schooling and their peers could well be unaware of any subject repetition. However, in the subject that a student repeats, the repeat status would likely be known to at least some classmates and the possibility of negative effects exists.

Students who fail a subject at the secondary level have the same two routes available to them as their elementary counterparts, depending on the decision of their teachers. Retention or social promotion are the two main routes that students who fail a course can travel. There are, however, two other routes available to some students: alternate courses or programs and remedial summer school. Alternate courses, such as Mathematics 9 Alternate, provide different curricula - modified curricula - to better meet the needs of students who, in the opinions of their teachers and parents, are incapable of mastering the regular curriculum at the present time. Alternate programs, which are often housed in sites separate from students' home schools, provide more individualized teaching methods and often address issues involving students' behaviours in an attempt to help students be more successful in school.

Remedial summer school, the fourth route available to secondary students who fail a subject, is the focus of the present study. Remedial summer school is an attempt to bring students up to grade level standards without repeating an entire year of a subject. Summer school programs with an emphasis on remedial education began appearing in the 1950s (Austin, Rogers, and Walbesser, 1972). The aim of remedial summer school programs has been to help students who have not attained satisfactory achievement standing catch up to their peers. Most of the remedial programs have focused on the secondary level in the areas of reading and mathematics.

Because of the considerable body of research which states that retention is not a beneficial practice, alternatives to repetition should be explored. Summer school is one of the alternatives.

Statement of the Problem

What effect does participation in a remedial summer school program have on students' subsequent mathematics achievement? And, to the crux of the matter, how does Mathematics 9 achievement of students who attend remedial summer school for Mathematics 8 compare with achievement of students who, instead repeat a year of mathematics before advancing to the next higher level?

Justification

The dropout situation is a related aspect of the standards issue. Some students who are unsuccessful meeting the standards required for advancement and, ultimately, graduation simply stop attending school. A recent report (MacKay, 1991) states the dropout rate in Canada for 1991 was 30%. Since dropouts have a documented negative impact on the economy (LaFleur, 1992) and since it is part of British Columbia's mission statement for schools that students contribute to a prosperous and sustainable economy, it seems imperative that the dropout rate be reduced. Because retention is correlated with later dropping out (Grissom and Shepard, 1989), retention practices need to be examined very closely.

In light of the negative findings of studies on grade repetition (Hagborg, Masella, Palladino and Shepardson, 1991; Byrnes and Yamamoto, 1986; and Holmes and Matthews, 1984), it seems important to investigate alternatives to nonpromotion and repetition for students whose achievement is below advancement standards. Remedial summer school is one alternative which allows students to salvage credit lost during the previous school year without suffering many of the detrimental effects of repetition.

But does summer school actually benefit students? Research studies which evaluate summer school's effectiveness have had conflicting findings. Some studies indicate that summer school is not particularly helpful (Green, 1988; Hoepfner, 1980; Womble, 1977) or has had limited success (Cale, 1992; Daniels, 1986). Others have found that students who participate in summer school programs show gains in achievement (Roderick, Inwood, and Hansen, 1979; Fox and Weinberg, 1967) and an increased desire to attend school and learn (Hink, 1986). However, few studies track the students through the following school year to determine what effects, if any, summer school has had on a longer term basis.

The purpose of this study is to provide some evidence to support or refute the practice of remedial summer school as an alternative to repetition. If students who participate in summer school are more or equally successful in a subsequent mathematics course than students who repeat, then summer school should be promoted as a better route to follow than repetition for students who fail a subject.

Research Questions

1. Is there a difference in Mathematics 9 achievement between students who pass Mathematics 8 at summer school and those who do not attend and pass Mathematics 8 after repeating it for a full year? It is important to note that the students who do not attend summer school will be a year older than those who do attend when Mathematics 9 achievement is examined.
2. Is there a difference in Mathematics 9 achievement between students who pass Mathematics 8 at summer school and those who fail it at summer school and need to repeat Mathematics 8 for a full year? It is important to note that the students who fail Mathematics 8 at summer school will be a year older than those who pass when Mathematics 9 achievement is examined.
3. Is there a difference in Mathematics 9 achievement between students who repeat Mathematics 8 for a full year without attending summer school and those who fail it at summer school and then repeat if for a full year?

Definition of Terms

Retention: nonpromotion; failure to advance to the next higher grade level. Retention results in grade repetition if at the elementary level, or subject repetition if at the secondary level.

Social Promotion: advancement to the next higher grade level without acquiring the grade level standards of the previous grade.

Remedial Summer School: program established to enable non-promoted students to acquire the necessary knowledge and skills to advance to the next higher grade level without repeating a full year of the subject.

Limitations

The present study will be limited to mathematics at the grade eight level in one school district. Generalizations to other subjects, grade levels, or districts could only be made cautiously.

Organization of the Study

Chapter I contains the background of the problem, statement of the problem, justification of the study, research questions, definition of terms, limitations, and a description of the organization of the study.

Chapter II is a review of the literature and contains sections on retention and remedial summer school.

Chapter III includes a restatement of the problem, the design of the study, population and sample, description of the remedial summer school program, data collection procedures, and data analysis procedures.

Chapter IV presents a description of the data collected, statistical analyses, results of hypotheses testing, and findings.

Chapter V contains the summary, discussion, and recommendations.

Chapter II

Review of the Literature

Retention: An Overview

History

Since schools have been organized by graded classrooms, retention has been practiced. Retention is usually considered a way of increasing individual student achievement while maintaining grade level standards. In the United States, until the 1930s retention was a fairly common practice with approximately 50% of students retained at least once in their first eight years of school (Rose, Médway, Cantrell, and Marus, 1983). In the 1930s social scientists challenged retention for its possible adverse effects on students' social and emotional well being. Social promotion became popular in place of retention. Students were advanced although they had not attained grade level standing because it was felt that advancement would be less harmful than retaining students and subjecting them to the stigmatizing experience of failure. Some students were still retained based on what educators felt was in the best interests of each individual student, but the number of retained students drastically diminished. As reported in Shepard and Smith (1989), U.S. Census Bureau enrollment data show that retentions in grade as indicated by the percentage of overage students in grade declined to an all-time low in the early 1970s. Recently, the practice of social promotion has been challenged.

> Beginning in the early 1960s educators noted a decline in student achievement on standardized tests that has generally continued to the present day. Many attributed this decline in scholastic achievement to relaxed academic and promotion standards and called for reinstatement of stricter promotion standards as a way of ensuring academic mastery (Rose, Medway, Cantrell, and Marus, 1983, p. 202).

Shepard and Smith (1989) report that the percentage of overage students began to climb in the 1970s as shown by the enrollment data from the U.S. Census Bureau. There has been a swing back toward tighter controls on advancement and adherence to minimum competencies as the basis for grade promotion. According to a 1990 policy brief from the

Center for Policy Research in Education, about 5-7% of students in American schools are retained each year; by ninth grade 50% of students have either failed at least one grade or are no longer in school. This is similar to the retention statistics prior to the 1930s (Rose, Medway, Cantrell, and Marus, 1983). Because the numbers of retained students appear to be on the increase, the arguments for and against retention have also increased.

Canadian Background

In Canada, grade retention appears to be a widespread practice as documented in two reports by the Canadian Education Association, *Grade Promotion and Retention: Practices in Canadian School Boards* (1989) and *Provincial Policies on Student Retention* (1986). However, no specific figures are given as to how prevalent retention is. Westbury (1994) comments that "... it is surprising that school boards and government agencies do not consistently collect promotion and retention rates" (p. 241). In the recent Royal Commission on Education Report, (Province of British Columbia, 1988), there is no mention of retention practices or statistics. Although retention statistics do not exist for Canada, retention does, as documented in the Canadian Education Association's reports (1989 and 1986).

Morrison (1991) and Graves (1990) both question the practice of retention in British Columbia. Morrison (1991) notes that the *Primary Program* (Ministry of Education, 1989) with its emphasis on "...learning environments that respect and value individual differences, in which the children are engaged in meaningful activities and experiences" (p. 19) is inconsistent with failure and repetition. "The concept of *readiness* .... becomes a nonissue in the context of such a curriculum, and retention is no longer a consideration at any grade level" (p. 19). If we are to promote continuous learning, how can we support retention when students have not attained a certain level of achievement? If we are to respect and value individual differences, retention does not make sense.

Rationale

Teachers, administrators, parents, the public, and students - even retained students - generally support the practice of retention (Byrnes, 1989). The arguments for retention are basically twofold:

1) to give students an opportunity to acquire knowledge and skills to allow them to be successful in subsequent years. Students who have not acquired sufficient skills at a particular grade level are not ready to advance to the next higher grade level. They would experience considerable frustration and difficulty with more advanced work. Therefore, they should repeat and have an opportunity to acquire proficiency with the prerequisite skills necessary for success at subsequent grade levels; and

2) to give immature students an opportunity to mature so that they are more able to benefit from instruction in subsequent years. Students who are emotionally, socially, or behaviourally immature would benefit from a chance to mature with younger peers before continuing on to achieve the maximum benefit from subsequent instruction.

Those opposed to the practice of retention question the logic behind repetition: why would a student who did not learn what was expected to learn the first time round learn any more the second time round in the same situation? What is the point behind recycling a student through an identical experience (Westbury, 1994; Germain and Merlo, 1985; Rose, Medway, Cantrell and Marus, 1983; Jackson, 1975)? Overman (1986) states that students who are retained "... learned less during the second year in a given grade than they would have learned if they had been promoted" (p. 609). In addition to the questionable benefits of repetition, it is a costly practice. According to a policy brief on grade repetition (Center for Policy Research in Education, 1990), retention in the United States costs nearly $10 billion a year - a considerable sum of money.

General Findings

Several reviews of research and meta-analyses of retention research have been conducted in the last twenty years (Holmes, 1989; Holmes and Matthews, 1984; Jackson, 1975). As shown below, their overall conclusion is that retention is a practice not supported by research (Shepard and Smith, 1989).

Jackson (1975), in his review of the literature, condemned the poor quality of the retention research he reviewed. He noted that many of the retention studies had flawed designs. He found that all of the retention studies could be sorted into three types: 1) studies that compared retained students to promoted students, without random assignment; 2) studies that compared the pre- and post-achievement of retained students, without control groups; and 3) studies that compared retained students to promoted students, where the students were randomly assigned.

Type 1 studies, although they involved control groups (the promoted students), did not involve random assignment to groups. It could be argued, then, that the groups of students being compared were initially dissimilar and that difference, rather than the fact that one group had been retained, could account for any variance in achievement of the two groups when compared at a later date. The initial difference could lead to bias in the results.

However, there are difficulties associated with randomly assigning students to the retained or promoted groups. If all failing students would normally have been socially promoted, then it would be unethical to randomly assign students to experimental (retained) and control (promoted) groups when harm might result to one group as a result. In this scenario, it could be argued that harm might accrue to the retained group in light of earlier research findings. According to Holmes and Matthews, 1984, "It is hoped that the decisions of school officials not to randomly select students for retention are not based solely on political considerations but also on possible consequences to the children in their care" (p. 226). To address the random assignment problem, researchers often match students in the experimental and control groups to ensure they are as similar as possible on relevant factors. Matching appears to be the best possible compromise between selection bias and ethical practice.

Type 2 studies lacked control groups. They compared pre- and post-achievement scores for students who were retained. Improvement could be just as likely attributed to maturation or regression as to repetition. Jackson concludes that "one who uses this design might conclude that even students who are not having difficulties in school would benefit from grade retention!" (Jackson, 1979, p. 623).

Type 3 studies were experimental; they involved random assignment to control or experimental groups. Type 3 studies are the best designed since they eliminate threats of selection, maturation, and regression. Unfortunately, Jackson only located three studies that fit this type and all of them were conducted prior to 1942. After analysing the results of all the studies, he makes the following conclusions:

> There is no reliable body of evidence to indicate that grade retention is more beneficial than grade promotion for students with serious academic or adjustment difficulties. ... Thus, those educators who retain pupils in a grade do so without valid research evidence to indicate that such treatment will provide greater benefits to students with academic or adjustment difficulties than will promotion to the next grade (Jackson, 1975, p. 627).

> The best justified conclusion that can be drawn from the 44 reviewed studies is the need for further research of a much higher quality than that conducted in the past (Jackson, 1975, p. 625).

Holmes and Matthews (1984) conducted a meta-analysis of 44 research studies. Although some of these same studies were included in Jackson's (1975) review of the literature, most of Holmes and Matthews' studies were different. Six, for instance, were conducted after 1975; another twenty of Holmes and Matthews' studies were theses and dissertations not included by Jackson (1975). Holmes and Matthews calculated effect size for each study and found that, on average, students who were retained were one third of a standard deviation behind students who were promoted. They calculated effect sizes for academic achievement, personal adjustment, attitude toward school, behaviour, and attendance. Promoted students had more positive outcomes than retained students on all measures. Holmes and Matthews (1984) conclude that "those who continue to retain pupils at grade level do so despite cumulative research evidence showing that the potential for negative effects consistently outweighs positive outcomes" (p. 232).

In 1983, Holmes analysed a subset of the 44 studies to specifically examine academic achievement of retained versus promoted students. He found eight studies with achievement data and matched groups. After determining effect sizes, Holmes found that achievement in reading, language arts, and arithmetic was lower for retained students than promoted students despite the fact that they had been matched on achievement test scores at the time of retention. Holmes surmises that "... retained pupils fall behind during the year that they are retained and spend the rest of their academic careers in [a] vain attempt to catch up" (p. 4).

Holmes updated his synthesis of research studies in 1989. Sixty-three studies were included; their effect sizes were calculated and analysed. Of the 63 studies, 54 had negative results while nine were positive. After a careful look at the positive studies, Holmes concluded that the conditions of retention they involved were different from the negative studies. The positive studies provided considerable remediation and individualization in addition to the retention itself. Holmes notes that no studies showing positive results for retention provided remediation and individualization for the control group (the promoted students) so conclusions about the effects of retention are clouded by the involvement of remediation and individualization. Were the positive results attributable to retention or to the extra attention the retained students received? Holmes notes that when only the better controlled studies are included in the analysis, the effects of retention are even more negative.

Generally, the retention literature indicates that:

1) repeating a grade does not bring more significant gains in achievement than social promotion (Holmes, 1989; Holmes and Matthews, 1984).
2) students who repeat suffer emotionally and socially (Byrnes, 1989; Jackson, 1975).
3) students who repeat a grade are far more likely to drop out of school at a later date than students who do not repeat a grade (Gilbert, Clark, Blue and Sunter, 1993; Grissom and Shepard, 1989).

Retention: Specific Findings

Attitudes and Beliefs

Adults. Tomchin and Impara (1992) conducted a study of 124 elementary teachers to try to unravel teachers' beliefs about grade retention. They found that teachers sincerely believe that retention is a benevolent intervention to assist less able students. Teachers view retention as a way of shielding students from more difficult work at the next higher grade level, work for which students lack the prerequisites. Tomchin and Impara found that teachers believe that retention allows students to make significant gains in the prerequisite skills necessary to future academic success. Teachers believe that significant gains will improve students' self esteem. They also believe that an extra year allows for social maturation.

In Tomchin and Impara's (1992) study, teachers were presented with 40 vignettes which involved permutations of factors known to be involved in retention decisions. For example, academic performance, maturity, size in relation to peers, and age were all factors that teachers indicated were part of their deliberations when determining whether a student should be retained or promoted. For each vignette, teachers were asked whether their decision would be retention or promotion. The results were consistent with teachers' beliefs described above.

Byrnes (1989) reports on interviews she conducted in an earlier study (Byrnes and Yamamoto, 1986) with 15 teachers of retained students in grades 1, 3, and 6. Her findings are consistent with Tomchin and Impara's (1992). Byrnes describes the teachers of retained students as concerned educators who agonized over their retention versus promotion decisions. Yet despite the difficulty of the decisions, "all ... teachers felt that although retention could be stressful for the child, it would be worse for the child if he or she was promoted" (p. 128). They believed that students would experience even more failure if socially promoted to the next grade because they would be unable to do the work required of them and their teachers would be unable to accommodate the students' lack of skills and need for remediation. Teachers were questioned, in survey format, about the success of individual students' retention experiences. "Of the sixty-two recorded responses to the question, 'How effective do you believe retaining *(child's name)* has been?' teachers believed that retention was effective in helping the child in 89 percent of the cases" (p. 128). Byrnes observes that teachers believe retention to be a beneficial practice.

Likewise, Smith (1989), in clinical interviews with 40 kindergarten teachers, found that teachers believed retention to be beneficial with virtually no ill effects. Teachers reported that retention reduced stress and frustration for the retained students and that there was no stigma attached to retention. They could not recall a single instance of bad repercussions from retention; instead, they shared promotion disaster stories based on students being advanced when they were not ready.

Smith postulates that teachers endorse retention because of their reliance on practical knowledge, "...the first-hand experience of a teacher with specific children and concrete circumstances" (p. 133). Unfortunately, "... the practical knowledge to which the teacher has access is incomplete and misleading" (p. 147). A teacher could see a retained student repeating a year and performing better than he did the first time round. The teacher believes that the student is making significant gains. However, the teacher has no knowledge of how the same student would have done if promoted. There is no control with which to compare the retained student's progress. In addition, teachers usually have little information on how retained students fare in their future school careers. Smith recommends that teachers work collaboratively with researchers in retention studies to allow teachers to extend their practical knowledge and "... reflect more broadly on educational policies and practices" (p. 150).

The widespread support for retention is not restricted to teachers. Byrnes and Yamamoto (1986) report that retention is supported by parents, as well. The researchers collected survey data from parents, teachers, and principals to ascertain their views on elementary grade retention. Of the 1063 parents surveyed, 59% felt that students should usually or always be retained for lack of basic skills. 65% of the 145 teachers and 74% of the 35 principals surveyed agreed. Byrnes and Yamamoto note that decisions about retention are made without knowledge of the research evidence.

Frymier and Gansneder (1989), as part of the *Phi Delta Kappa Study of Students at Risk*, gathered data from educators across the United States. Their results contradict those listed above in a significant manner; the majority of participants in the Phi Delta Kappa Study did not believe that retention was a beneficial practice. To explain this discrepancy the authors offer this explanation:

> Some of the data reported ... do not seem to square with reports in the general media. The discrepancies may be a function of the fact that our sample, even though it was large, was not selected according to conventional statistical criteria to guarantee representativeness. (For one thing, chapters volunteered to participate) (p. 144).

It may also be the case that educators who work with older students feel more negatively towards retention. Unlike the studies reported above which involve elementary educators or parents of elementary students exclusively, the Phi Delta Kappa Study involved educators from three different levels of schools: elementary, middle or junior high, and senior high. The majority of educators surveyed, 66% of the principals and 78% of the teachers, were from the junior or senior high levels. Although the authors do not provide an analysis of results based on educators' school level, it is possible that educators working with older students feel less favourable towards the practice of retaining students.

Of the 276 principals surveyed, 71% said they regularly retained students but only 26% said it was effective. Similarly, less than half of the 9652 teachers surveyed believed that retention was effective. Although retention was widely practiced, a minority of participants felt it was successful.

Miller, Frazier, and Dean (1980) found similar results in their survey study involving 150 elementary, secondary, and special education teachers enrolled in a university summer course. They found that teachers generally believed that retention did not result in gains in subject matter and that it did lower self concept. The possibility exists here, as above, that secondary teachers' beliefs were different from their elementary colleagues. However, since the authors aggregate the response data, it is impossible to investigate this explanation. Of course, since the teachers were all pursuing summer education, they are unlikely to be a representative sample of the population of teachers and, therefore, their results have questionable generalizability.

However, the teachers surveyed still supported the practice of retention, despite their agreement "... that retention does not promote subject-matter mastery and that it may be detrimental to the child's self concept ..." (p. 157). Why, then, do teachers continue the practice? The authors suggest that "... perhaps [the teachers] felt the weight of presumed opinions held by the public or by other teachers" (p. 157). They conclude that teacher inservice is warranted to disseminate the retention research findings and to examine alternatives to retention.

The information described above details the attitudes and beliefs of educators and parents towards the practice of retention. What follows is a report of research on the attitudes of retained students.

Children. Byrnes (1989) reports on interviews she conducted with 71 students in grades 1, 3 or 6 about their feelings on retention. The interviews were part of her earlier study (Byrnes and Yamamoto, 1986) but not reported there. While teachers believe that retaining students early is not a stigmatizing experience (Smith, 1989), students interviewed by Byrnes reported differently. Byrnes questioned students she knew had been retained, yet many denied it. Evidently, they "... did not feel comfortable admitting they had been retained" (p. 116). Byrnes interpreted their denials as a reflection of their shame and awareness of the social stigma of retention. Students who did admit that they had been retained said they felt sad, bad, or upset about "flunking" (their word). They said that other kids teased them.

Students reported that their parents felt mad or sad to learn that their children were being retained and a large proportion of children, 47%, reported that they had been punished for flunking. Byrnes admits that she has no data on whether the children were punished, but notes the perception of students that they were punished is significant.

Despite the students' feelings, when retained students were asked if having students repeat a grade was a good idea, 42% said yes. When students who had not been retained were asked this same question, 60% said yes. Byrnes concludes that "... all of the children were well on their way to seeing retention as deserved punishment for poor work, in much the way that parents and teachers saw it as a necessary corrective" (p. 108).

Long-Term Effects

Westbury (1994) reports on a study she conducted in Edmonton's public schools involving grade 6 students. She compared the achievement of 125 students who had been retained once in grades 1, 2, or 3 with the achievement of 84 normally promoted students. The two groups were matched on the basis of gender, school entry reading achievement (tested when students were in grade 1), grade, and regular school program. She found that "... the retained students show neither positive academic gains nor negative academic losses when compared to the promoted group on ... subject matter achievement" (p. 247). She notes that one might have expected the retained students to perform better since they had "... the benefit of an additional year of schooling to increase stored knowledge and subsequent achievement in subject matter test" (p. 248) and they were a year older than the normally promoted students. Her results suggest that grade repetition has not had the desired result and that alternatives should be examined.

Hagborg, Masello, Palladino, and Shepardson (1991) report on a follow up study of students who had been retained in their elementary years. They compared 38 high school students who had been retained at some point in their elementary career with a matched control group of nonretained students. The authors found that retained students were significantly lower on measures of academic achievement and they were more often absent from school. In addition, the authors found that the later a student had been retained, the lower his grades, less positive his attitude to school, less time he spent on homework, lower his educational expectations, greater his discipline problems, and the lower his self control. They conclude that "... the later a student is retained the greater the challenges that student will present to educational personnel to attain an adequate level of school success" (p. 315). Hall and Wallace (1986) agree that the earlier retention takes place, the less damaging its effects are. Germain and Merlo (1985) also believe that if retention is going to occur, it should occur earlier rather than later whenever possible.

Dropouts

An extended look at the repercussions of retention was conducted by Grissom and Shepard (1989). While educators commonly believe that retention is useful for preventing future dropouts because students are not advanced unless they are capable of handling the more difficult work at the next level, in fact, the opposite is true. The correlational evidence suggests that retaining students increases rather than decreases their risk for dropping out of school. While the correlation between grade retention and the tendency to dropout has been documented in several studies, "... its potential importance for educational policy has been dismissed because of the obvious explanation that poor achievement likely accounts for both retention and school leaving" (p. 35). The argument is that students with low interest in school, little home support, and other factors which put them at risk contribute to both their low achievement and their tendency to dropout. Retention, itself, is merely correlated with dropping out.

Grissom and Shepard report on several studies which note retention figures for dropouts. In a study conducted by the Association of California Urban School Districts (1985), it was reported that Los Angeles dropouts had been retained five times more often than graduates and that those students who failed either of the first two grades had only a 20% chance of graduation. In Canada, the results are similar: dropouts have been retained almost five times more often than graduates. The figures indicates that 36% of dropouts had failed a grade compared to only 8% of the graduates (Gilbert, Barr, Clark, Blue and Sunter 1993).

Grissom and Shepard (1989) argue that it is possible to untangle the effects of poor achievement from retention and determine a direct relationship between retention and later dropping out. They report on several studies where adjustments were made for student achievement before examining the effects of retention on dropping out. They note that in one study where achievement was controlled, the "... dropout rate of overage students [was] 13 per cent higher than the dropout rate of normal-age students with equivalent reading achievement scores" (p. 40). The use of overage students as an indicator of students who have been retained is somewhat problematic because it implies that being overage in grade is synonymous with having been retained. While there are other reasons for students being overage in grade, for instance, parents may hold their children back a year from entering school to try to afford them a better chance of success, since retention statistics are not kept in a majority of school districts, overage in a grade is often the best indicator of retention rates.

Grissom and Shepard (1989) make use of "... causal modeling techniques to assess the direct effect of grade repetition on dropout behavior while accounting for relevant background factors, especially school achievement" (p. 34). They observe that grade retention has a significant effect on dropping out even after student background, sex, and achievement are controlled.

No experimental research exists on the effects of retention on later dropout rates since it is difficult to randomly assign some students to be retained while others are promoted; however, when groups are matched on an array of factors in an attempt to control for selection bias, research suggests that dropping out is correlated with retention. Students who have been retained are more likely to dropout of school than students who have not been retained. According to a report on high school leavers in Canada during 1991, Higgins (1993) reports that retention is more than three times as likely to have occurred among dropouts than among graduates: 40% of male dropouts had failed a grade in their elementary career compared to 12% of male graduates. For females, retention is more than five times as likely to have happened among dropouts than among graduates: 27% of dropouts had failed compared to 5% of graduates. Retention does not prevent future dropouts as some of its advocates suggest.

In a report titled "Dropping Out: The Cost to Canada", LaFleur (1992) presents figures to illustrate the tremendous costs associated with dropping out. She notes that because students who dropout have lower paying jobs, they pay less taxes and are more likely to lose their jobs in times of economic stress. Dropouts have higher unemployment rates than graduates and, therefore, draw unemployment benefits more frequently. According to LaFleur, "Canada will lose more than $4 billion in present-value terms over the working lifetimes of the nearly 137 000 youths who dropped out of secondary school instead of graduating with the class of 1989" (p. 1).

Jefferson (1992) notes that an increasing number of students are leaving school prematurely in Canada. She argues that "although one might see this positively under present financial constraints, the cost is merely shifted to a different arena" (p. 97). An uneducated learner is going to be unproductive in the labour force and an economic liability in the future.

MacKay (1991) also examined the costs associated with dropouts in Canada. MacKay found that, similar to LaFleur's (1992) information, the unemployment rate for students who drop out is double the graduate unemployment rate. He also found that the average income of dropouts is 80% that of non-dropouts, therefore, dropouts pay less in taxes and make lower unemployment insurance contributions. He states that the dropout rate in Canada for 1991 was 30%.

<u>Learning Disabled Students</u>

McLeskey and Grizzle (1992) report on a study involving students with learning disabilities. They discovered that approximately twice as many students with learning disabilities are being retained in Indiana as students without disabilities. While this is not surprising, the important point is that more than half of the 689 students McLeskey and Grizzle studied had been retained before they were identified as having learning disabilities. They concluded that retention was being used as a remediation tool in the absence of any other interventions. Byrnes (1989) also reported on retention occurring prior to assessment of learning difficulties.

McLeskey and Grizzle compared the learning disabled students who were retained with those who were promoted. They found that the retained students "... tended to have IQ and achievement levels significantly below students who were labeled with learning disabilities but not retained" (p. 552). They suggest that this is contrary to recommendations as to which students are the most likely to benefit from retention. Those most likely to benefit from retention are generally believed to be students whose IQ and achievement levels are close to their promoted peers. The argument is that students whose abilities are well below their peers would not benefit from retention; it is unlikely that repetition of a grade would allow them to acquire the deficient skills. It is far more likely that intervention of some sort, such as individualization or intensive pull-out classes for a portion of the student's day, would have greater benefit for these students. The authors note that the students with learning disabilities who are being retained in Indiana are those least likely to benefit from retention.

McLeskey and Grizzle argue for alternative intervention and remediation strategies. They believe that retention is not an effective remediation strategy and, since students with learning difficulties do not benefit from retention, its widespread use should not continue.

Positive Studies

Although the vast majority of research on retention suggests that it is not a beneficial practice, as noted in Holmes (1989) there have been some studies which show positive results for retention. Lenarduzzi and McLaughlin (1990) is one such study. The study involved 33 junior high school students in British Columbia. All of the students had failed two or more academic courses. They were divided into three groups: a control of twelve grade 7 students who were probable failures but had been "arbitrarily promoted" (p. 214) to grade 8; an experimental group of ten grade 7 students who were retained at the grade 7 level; and a second experimental group of eleven grade 8 students who were retained at the grade 8 level.

The researchers gathered achievement and effort data from students' report cards as pre- and post-test measures. Each letter grade and effort comment were assigned numerical values and totals for three subject areas, mathematics, English, and social studies, were calculated at the end of students' first year in grade, and at the end of their second year (in the case of the control group, at the end of the year in which they were promoted). Change between the pre- and post-test totals were calculated. The researchers found that the experimental retained students' change scores were significantly greater than the promoted control students' for both academic achievement and effort. The authors conclude that retention results in noticeable improvement. They suggest that "as more people come to realize that the word "failure" is really a misrepresentation of the concepts of preparedness, cognitive development, and maturity, then perhaps healthier and even more beneficial results can be attained through the retention of students" (p. 216).

These results, however, must be viewed cautiously in light of a potential selection problem. The researchers assumed that the promoted control group and the retained experimental group of grade 7 students were initially similar, and perhaps they were. Their initial achievement and effort scores were not significantly different. However, there was no random assignment of students to group and the authors provide no information as to the process followed to determine which students were retained and which were promoted. The authors state that the control group was arbitrarily promoted but they do not claim the assignment was random. Why not? If promotion was arbitrarily determined, why not also make promotion random among the sample? Random assignment would have eliminated any selection bias and made their findings stronger.

Pierson and Connell (1992) conducted a study with 235 grade 3 through 6 students in New York. They attempted to address Jackson's (1975) concern for inadequately matched groups by comparing retained students to three control groups: a randomly selected control group, and two nonretained matched groups. One group was matched on current intellectual ability and the other was matched on classroom achievement at the time of retention. Pierson and Connell considered this last group to be socially promoted. While the retained group consisted of 74 students, only eight could be found to be part of the socially promoted group. The researchers supplemented the socially promoted group by adding students who had similar grade point averages to the retained students at the time of the retention decision.

When the academic achievement of the four groups was compared, the researchers noted that the retained students performed about the same as the nonretained matched ability control group, but more poorly than the randomly selected control group. The retained students performed significantly better than the socially promoted group. They conclude, therefore, that retention is a potentially effective remediation strategy for academic difficulty.

Pierson and Connell attempted to match students in the control and experimental groups because random assignment was impossible. However, they encountered a problem. The problem was with the initial comparability of the retained students with the socially promoted students. The initial group of eight socially promoted students could be considered similar to the retained group since their school records indicated that retention was recommended by their teachers but not carried out. But when the researchers supplemented the group with 27 other students whose grade point averages were similar to the retained students, they introduced a confounding variable. The addition of the 27 students threatens the initial comparability of the retained and socially promoted groups since the 27 students must somehow have been different or else they would not have been promoted; they would have been retained. This design flaw calls Pierson and Connell's results into question.

Holmes (1989) did find some better designed studies that concluded with positive results for retention. However, as described previously, the retention treatment also involved remediation and individualization. It is unclear whether the positive results are due to retention or to the other interventions because none of the positive studies had similar interventions available for the control groups of promoted students.

Summary

Smith and Shepard (1989) believe that the accumulation of evidence on retention is conclusive and shows no benefit. Rather, retention results in problems for students, teachers and the educational system. They note that "... no other body of educational research is so one-sided as that relating to retention" (p. 214).

Frymier (1990), in a dramatic article comparing two crisis situations, writes that "the heart attack victim has a better chance of surviving than the child facing grade retention." The research shows that students who repeat a grade frequently suffer consequences. Their self esteem, academic achievement, and chances of graduating all suffer. Their risk of dropping out of school is substantially increased. Students who have been retained experience many difficulties.

Summer School

Overview

In light of the negative findings described above, alternatives to repetition need to be explored. Summer school is one alternative that may serve to satisfy the minimum competency advocates. While summer schools have served purposes other than the removal of academic deficiencies, those dedicated to this single purpose are the subject of the following discussion. Summer school sessions are geared to providing students who are below grade level standard opportunities to acquire skills and credit necessary for advancing them with their age cohort.

Austin, Rogers and Walbesser (1972) conducted a review of summer school research in the United States. The researchers note that considerable monies have been provided by Congress in an attempt to help disadvantaged students catch up to their peers, especially in the areas of reading and mathematics, but that the results are inconclusive.

The research on summer school programs has generally been of two types. The vast majority consist of studies in which pre- and post-test measures of a group of students are compared. (Cale, 1992; Roderick, Inwood and Hansen, 1979; Fox, Birnbaum, Greenberg and Buchholz, 1969; Soar, 1969; and Fox and Weinberg, 1967) These studies generally show modest achievement gains (Austin, Rogers and Walbesser, 1972), but there is no control group with which to compare them. Perhaps the growth summer school students experience is a factor of maturation rather than participation in summer school.

The smaller group of research studies compares students who attended summer school with those who did not (Green, 1988; Daniels, 1986; Hink, 1986). Conclusions about the benefits of summer school are made. Assignment to experimental or control group has not been random and results have been inconsistent.

Two studies (Womble, 1977; and Leviton and Kiraly, 1975) compare achievement of randomly assigned experimental and control groups. Neither study found that summer school students performed significantly better than students who did not attend.

<u>Specific Studies</u>

Leviton and Kiraly (1975) studied 35 matched pairs of learning disabled children in grades 1-3. One member of each pair was randomly assigned to a summer school program while the other was assigned to the control group. The summer school program consisted of a daily 80 minute tutorial session in reading, mathematics, and language arts for six weeks. The researchers compared achievement measures prior to summer school, immediately after, and six months later. Leviton and Kiraly found that

> since the only academic subject that the summer program improved was arithmetic, and it was improved only temporarily, this study offers little empirical justification to the common practice of referring learning disabled children to summer compensatory programs (p. 49).

Similarly, Womble (1977) studied almost 700 disadvantaged students in grades 4 and 8 who had been randomly assigned to either the control group or experimental group. The experimental group attended summer school in mathematics and/or reading. Womble found that there were some initial advantages for the summer school students, but that the differences were nonexistent by the end of September.

Hoepfner (1980) also questioned the importance of summer school. He analyzed data collected in the *Sustaining Effects Study* and found the following:

- Students who attend summer school tend to be low achieving and comp-ed [compensatory education] students.
- Summer school does not provide a very intensive academic experience.
- There is no tendency for students to lose school-year gains over the summer. This is true for comp-ed students, low-achieving students, and minority students. Comp-ed students grow at a slightly lower rate over the summer than regular students.
- Growth during the summer is larger for reading than it is for math [sic]. (There were some small declines in math [sic] means).
- Students who attend summer school grow [in terms of achievement] at the same rate as similar ones who don't go to summer school (p. 81).

All of the above findings are based on measures taken at the end of the summer. Hoepfner suggests that they may be short-sighted since no long term assessment was conducted. He wonders if participation in summer school might have some long term benefit that would allow students to be more successful in their future schooling.

Daniels (1986) attempted to evaluate longer term effects of participation in summer school. He used a nonequivalent group, pretest-posttest design to compare changes in attendance, credit earned and grade point average of 70 grade 9-12 students who voluntarily participated in summer school with 70 control students who did not. The two groups of students were initially very different. The students who enrolled in summer school were there because they had all failed a course. The 70 control students were randomly selected from the general population of the school, but were not necessarily students who had failed. Daniels does not provide any information to suggest the control group was even matched to the experimental. He does, however, in his recommendations suggest that future research should use students who have also failed a subject as the control group.

Although the results he found for grade point average were inconclusive, Daniels found significant differences with credit earned and attendance. He found that students who attended summer school increased the credits they earned the year following summer school compared to the year before. They also improved their attendance. Their improvements were greater than those for the control group. However, the improvements could be attributed to the regression effect since the students who attended summer school had less credits earned and poorer attendance in the year prior to summer school than did the control group. It is difficult to give much weight to his findings because of the differences in the groups he compared.

Hink (1986) also measured the long term effects of participation in summer school and attempted to ensure that the control and experimental groups of students were similar. She used a time-extended, pre-test - post-test control group design in which 48 students in grades 1-9 who voluntarily participated in summer school were matched with 48 other students who did not participate. Each experimental group student was matched with a control group student by the classroom teacher. Students were matched for sex, age, socio-economic level, reading group and mathematics class. Hink did not check the thoroughness of the matching, instead she relied on the teacher to provide equivalent students. She notes that students who participated in summer school were not necessarily the neediest; many of the students had fairly good grades initially. It was not the case that the students would fail and be retained if they did not attend summer school.

Hink analysed test scores and grades from the two groups of students in the spring prior to summer school and the spring following. She found that there were no differences in attendance, standardized test scores or report card grades between the control and experimental groups. However, she notes that teachers, parents, and students all had positive attitudes about summer school and felt that it was of benefit. Hink suggests that although she found no achievement benefits to summer school as assessed the following spring, the positive feelings and attitudes about school that were shared by the participants suggests that summer school is of value. She recommends summer school be promoted as a remediation technique for attitudinal change. She implies that attitudinal change will result in increased achievement, although her findings do not support this implication. Hink recommends that future research consider even longer term effects of participation in summer school.

Green (1988), like Hink, used assessment data from the spring prior to summer school and the spring after to determine the effects of summer school after some time had passed. His study attempted to answer the question "Is summer school an effective alternative to nonpromotion in the elementary school?". His study involved all 385 grade 1 and 2 students in a particular school district: 255 were normally promoted, 107 were not promoted, and 23 attended summer school. The students who attended summer school would have otherwise been retained. Although he does not specify, it appears as though attendance at summer school was voluntary.

Green found that there were no statistically significant differences between the achievement of students who attended summer school and nonpromoted students who did not attend the summer program. He notes the following:

> The results of this study indicated that the normally promoted group regressed in terms of their relative position between the 1985 and 1986 administrations of the ITBS. The nonpromoted group appeared to remain about the same although they had an extra year in the same grade. The promoted with summer school group gained new knowledge and raised their relative position on the 1986 ITBS. The data analyzed for this study appeared to indicate that the summer school program provided additional instruction in the basic skills which may have prevented the students who attended the summer school from falling further behind during the summer and being better prepared for the following year's instruction (p. 72-73).

Green believes that summer school was of benefit to its participants.

Hyman (1988) also found benefit to students who participated in summer school. He used a one group, pretest-posttest design with 158 students in grades 4-8. All of the students were at least one year below grade level in mathematics, reading, or both. Participation in summer school was voluntary and represented about 22% of the 725 students who were eligible to attend.

Hyman found that achievement in reading and mathematics improved. This study, however, did not utilize a control group and it is impossible to determine if the improvement is due to summer school or to maturation. Soar and Soar (1969) suggest that students do experience summer gains, even without attending summer school. Hyman recommends that future research employ a quasi-experimental design in order that the performance of those attending summer school may be compared with a similar group.

Cale's (1992) report of summer school progress of students in Austin, Texas also lacks a control group. However, his findings strongly indicate that summer school was beneficial for its participants. In 1987, the Austin Independent School District implemented a strict promotional standard: students who did not achieve 70% and master essential concepts would not pass. The standard meant subject retention for 4000 high school students.

A summer school program was created to allow students who were within ten percentage points of being promoted to gain core academic credit. Students who qualified were invited to participate and, if they chose to attend, they worked out individual contracts with their summer school teacher and their parents as to the amount of work required for credit. The students completed their work independently but school was open for four hours every day for six weeks; students were required to put in 30 hours of class time. The success rate of the program in its first year was 90%; that is, all but 10% of the students who contracted to achieve subject credit actually did so. In the second year of the program its success rate rose to 95%.

The tremendous success of the program allowed 79% of the junior high and 52% of the senior high school students who were scheduled to be retained to be promoted, instead. Cale notes that the successful students were given another opportunity to graduate with their class. He also gathered some information on the long term effect of participation in the program; he examined the number of failing grades students who participated in the first year of the program had in the year prior to summer school and then the year following. He found there was a decrease of 40% in the second year. This suggests that there was some lasting benefit from participation in summer school.

Summary

Although the literature on summer school is not so overwhelmingly one-sided as that of the literature on retention, there has been some support for the use of summer school as a remediation technique. Some studies have shown significant benefit to summer school participation. In a few studies where long term effects of summer school have been examined there has also been some support.

Related Research and the Present Study

In the district where the present study is to be conducted, a formal policy on retention/promotion exists but does not clearly support one approach over the other. On the one hand, the policy clearly states that social promotion is not approved, but on the other hand, teachers are directed that promotion should generally be by age. The district is currently examining the retention/promotion policy in light of current research findings and the principles of learning as stated in the Ministry of Education's (1993), *The Intermediate Program Policy*, specifically, the principle that "people learn in a variety of ways and at different rates" (p. 3). Some would argue that the practice of retention is in direct opposition to the principle of continuous learning (Tranter, 1992).

A discussion of retention literature earlier in this chapter has shown retention to be a practice of little benefit with many problems. However, retention is on the rise as educational excellence reformers insist on stricter promotion standards.

> The position of these advocates has become so politically popular that as of 1985 thirty-one states had mandated stricter promotion policies, others were considering doing so, and in those states that had not yet considered adopting such policies, retention rates were increasing (Pierson and Connell, 1992, p. 300).

Because of the trend to retain more students and the lack of research support for this practice, alternatives need to be explored.

Remedial summer school is one alternative which allows students to acquire skills necessary for promotion to the next higher level. Madak (1994) suggests that "junior and senior high schools could promote students on condition that they take part in a summer school program" (p. 24).

Many of the studies reviewed in this chapter have had design difficulties. The difficulties are basically of two types: 1) comparisons between nonequivalent groups, and 2) pre-test/post-test comparisons of the same group without a control group. The first difficulty allows for selection as a possible explanation of results. For reasons stated earlier, it is difficult to conduct a true experimental study to examine the effects of retention. The same holds true for summer school. It is impossible to randomly assign students to be retained or to attend summer school. The present study attempts to handle the selection difficulty through matching to ensure groups are equivalent. Although random assignment is impossible, groups used in this study will be matched in terms of the relevant factor, their Mathematics 8 achievement in the 92/93 school year.

The second difficulty, comparison of pre-test/post-test achievement of only one group, allows for maturation and statistical regression as possible explanations of results. The present study will examine pre-test/post-test achievement for two groups of students: those who were retained and those who attended summer school. Because there is more than one group, differences in post-test achievement will not be attributable to maturation nor statistical regression.

Chapter III

Research Methodology

In the previous chapter a clearly negative picture of retention was painted. Since remedial summer school is one strategy for avoiding retention, further research needs to be conducted on the effects of summer school.

Restatement of the Problem

The present study attempts to evaluate the efficacy of remedial summer school as an alternative to retention for mathematics at the junior high school level. The literature on the effects of remedial summer school provide some support for its use as a remediation technique. Successful completion of a subject at summer school would eliminate the need for subject repetition and its harmful effects as discussed in the previous chapter. The specific research questions to be addressed are as follows:

1. Is there a difference in Mathematics 9 achievement between students who pass Mathematics 8 at summer school and those who do not attend and pass Mathematics 8 after repeating it for a full year? It is important to note that the students who do not attend summer school will be a year older than those who do attend when Mathematics 9 achievement is examined.
2. Is there a difference in Mathematics 9 achievement between students who pass Mathematics 8 at summer school and those who fail it at summer school and need to repeat Mathematics 8 for a full year? It is important to note that the students who fail summer school will be a year older than those who pass when Mathematics 9 achievement is examined.
3. Is there a difference in Mathematics 9 achievement between students who repeat Mathematics 8 for a full year without attending summer school and those who fail it at summer school and then repeat if for a full year?

Design

Three groups of students will be used in the study as shown in Table 3.1.

Table 3.1

Students who Receive an Incomplete Mark in Mathematics 8

Group 1	Group 2	Group 3
No Summer School	Pass Summer School	Fail Summer School
Repeat Mathematics 8	Take Mathematics 9	Repeat Mathematics 8
Take Mathematics 9		Take Mathematics 9

An *ex post facto* design will be used to answer the three research questions. The design will be as outlined below:

Group	Pre-test	Treatment	Post-test
1 --------->	O----------->	X_1 --------->	O
2 --------->	O----------->	X_2 --------->	O
3 --------->	O----------->	X_3 --------->	O

The pre-test will be students' initial Mathematics 8 final marks; treatment X_1 will be successful completion of Mathematics 8 by repeating the course; treatment X_2 will be successful completion of Mathematics 8 by attending remedial summer school; treatment X_3 will be successful completion of Mathematics 8 after having failed it at summer school; and the post-test will be students' Mathematics 9 final marks. Campbell and Stanley's (1963) threats to validity are addressed below (selection, history, maturation, mortality, and statistical regression).

The present study investigates the effect of something that had already happened, summer school 1993. In an attempt to determine if there is relationship between attendance at summer school and subsequent mathematics achievement, mathematics achievement at the next higher level will be compared among three groups of students: those who repeated a year of Mathematics 8, those who attended summer school and passed, and those who attended summer school, failed, and repeated a year of Mathematics 8. The working hypothesis is that subsequent mathematics achievement of students who attended summer school and passed will be equal to or higher than the achievement of students who did not attend or who attended and failed.

Because summer school 1993 is in the past, the present study must use an *ex post facto* design. It is important in *ex post facto* studies to limit plausible rival hypotheses and enhance control. *Ex post facto* studies have several threats to their internal validity. These are identified below, along with suggestions as to how they will be addressed in the present study.

<u>Selection</u>

The study involves all students who failed Mathematics 8 in the 92/93 school year, approximately 80 students. Some of these students attended summer school in 1993; others did not. The researcher did not manipulate who attended and who did not; students were not randomly assigned to one group or the other. Rather, some students chose to attend summer school while others did not. All students, however, were similar in terms of initial mathematics achievement (failure in Mathematics 8) and lack of credit received from their schools. All students would have had to repeat Mathematics 8 if they did not attend summer school. Although summer school fees were $90 per course, they were waived for any student who could not afford the cost. School counsellors and administrators made this known to students who had financial difficulty with the fee and encouraged their attendance. Therefore, access to summer school was not restricted; admission was available to all. To try to further control some selection problems, students who attended summer school will be matched for gender and home school with students who did not attend and repeated, instead. Although random assignment was not possible, matching will attempt to ensure both experimental and control groups are similar on relevant factors.

History

Two groups of students completed Mathematics 9 in June 1995 - those who chose not to attend summer school those who attended but failed. One group completed Mathematics 9 in June 1994 - those students who passed summer school. Since one group finished a year ahead of the others, the history of the three groups is different. However, no curriculum changes to mathematics nor to schools' organization took place in the two years and any bias that may exist would favour the retained groups since those retained would have received more instruction in mathematics - a full year versus a month at summer school.

Maturation

Similar to the history threat above, because the study was of a two year duration for one group of students, maturation needs to be considered for its effect on Mathematics 9 achievement. Since students who chose not to attend summer school and those who attended and failed did not complete Mathematics 9 till June 1995 while those who passed summer school completed a year earlier, it could be argued that the non-summer school and failed students would be more mature at the time Mathematics 9 achievement data were collected. Westbury (1994) notes that retained students have more chance of reaching "a higher developmental stage necessary for increased achievement" (p. 248) than non-retained students. The difference in age between the groups is a limitation of the study which favours the retained students.

Mortality

Because the study examines the subsequent mathematics performance of students, it requires some time to complete data gathering. A maximum of two school years will have passed before two groups of students repeat Mathematics 8 then complete Mathematics 9. In two years, some students will have moved out of the district and achievement data will no longer available. It is also likely that some students will have entered an alternate mathematics course (Mathematics 9A) and still others will have entered alternate school programs. It is also probable that some students will have dropped out of school altogether. The question is, then, are the students who drop out, attend alternate programs, take alternate mathematics courses, or move, different in some way from those who remain? The researcher is unsure at this time whether this question can be answered. However, given the size of the sample to begin with, the researcher anticipates that enough students will remain to allow inferences to be drawn from the achievement data.

Statistical Regression

The study involves only students who received an incomplete mark in Mathematics 8. Therefore, it is expected that there will be some regression to the mean which could result in improved grades for Mathematics 9. However, since all groups of students have similarly low achievement to begin with, regression can be expected to affect each group equally. Comparisons of Mathematics 9 achievement between the groups will not be complicated by regression since it affects all groups equally.

Population and Sample

Students in the study will be all public school students who received an incomplete mark Mathematics 8 in the 92/93 school year in a lower mainland school district in British Columbia. The achievement of students will be tracked until completion of the next higher level of mathematics. Students who failed their mathematics course in the 92/93 school year could either repeat the full course in the 93/94 school year or attend an abbreviated version at summer school for the month of July. Enrollment in remedial summer school is voluntary. Students who enroll aim for "Pass" standing; if they achieve Pass standing they advance to the next level of mathematics the following year; if they do not, they repeat the same level of mathematics again the following school year. Students who select Mathematics 9A or attend an alternate school in the subsequent year will be excluded from the sample. The remaining students will be divided into three groups as follows: 1) students who failed and did not attend summer school; 2) students who failed, attended summer school and passed; and 3) students who failed, attended summer school and failed again.

Description of Summer School Program

Remedial summer school exists at one site for the entire district. Academic subjects from grades 8 - 11 are available and students may register for a maximum of two courses. In July 1993, there were 530 students registered and 167 of those took two courses. Each course meets for an hour and a half per day, five days a week, for four weeks (approximately 30 hours of coursework). Class sizes are kept low. In July of 1993 there were four Mathematics 8 classes with a total enrollment of 65 students (two classes of 17 students, one of 16 and one of 15).

Data Collection Procedures

The sample will be identified by accessing the achievement records for the 92/93 school year from the public schools in the district. All students who received an incomplete mark in Mathematics 8 will comprise the sample. Remedial summer school records for July 1993 will be examined to allow the sample to be separated into the three groups as identified above.

Each school will be contacted to determine students' marks information for the following school year, 93/94. Marks information will be required for June 1994 and June 1995 since students who chose not to attend summer school and those who attended but failed would have to repeat Mathematics 8 again in the 93/94 school year before advancing to Mathematics 9 in the 94/95 school year. Final June 1994 and June 1995 Mathematics 9 marks information will be gathered and analysed.

Data Analysis Procedures

The three research questions, stated below as null hypotheses, will be addressed through the use of dependent samples t tests.

H_{01} There is no difference in Mathematics 9 achievement between students who passed Mathematics 8 at summer school and those who did not take summer school but passed Mathematics 8 after repeating it for a full year.

H_{02} There is no difference in Mathematics 9 achievement between students who passed Mathematics 8 at summer school and those who failed it at summer school.

H_{03} There is no difference in Mathematics 9 achievement between students who did not attend summer school and repeated Mathematics 8 for a full year and those who failed Mathematics 8 at summer school and repeated it for a full year.

Final marks at the grades 8-10 level are reported as letter grades rather than percentages. However, in order to test for differences among groups in the study it is necessary to assign a numerical value to each letter grade. The values used in this study are in place in most secondary schools in the district for calculating honour roll status. They are shown below:

Letter Grade	Percentage	Numerical Value for Present Study
A	86-100	4
B	73-85	3
C+	67-72	2.5
C	60-66	2
P	50-59	1
I	40-49	0.5
F	0-39	0

There is another letter grade used in some circumstances: SG, which represents Standing Granted. It is generally used for percentages between 40 and 49 where the teacher feels that the student has put forth some effort but has continued to experience difficulties. Students who receive SG standing are not required to repeat their mathematics course, but they are also not eligible to proceed to the next higher level of mathematics. Instead, they proceed to an alternate mathematics course. SG will be assigned a numerical value of 0.5. The null hypotheses listed above will be tested at the 0.05 level of significance.

CHAPTER IV

Findings

The purpose of this study was to provide some evidence to support or refute the practice of remedial summer school as an alternative to repetition of Mathematics 8. To provide the evidence, three research questions were formulated investigating three different groups of students who received incomplete marks in Mathematics 8 in the 92/93 school year. They are stated below as null hypotheses:

H_{01} There is no difference in Mathematics 9 achievement between students who passed Mathematics 8 at summer school and those who did not take summer school but passed Mathematics 8 after repeating it for a full year.

H_{02} There is no difference in Mathematics 9 achievement between students who passed Mathematics 8 at summer school and those who failed it at summer school.

H_{03} There is no difference in Mathematics 9 achievement between students who did not attend summer school and repeated Mathematics 8 for a full year and those who failed Mathematics 8 at summer school and repeated it for a full year.

There were 84 students in the district who received incomplete standing in Mathematics 8 in the 92/93 school year. However, as stated earlier, students who selected Mathematics 9A or attended an alternate school were excluded from the sample. Ten students selected Mathematics 9A and 6 attended alternate schools. Another 6 students moved; one quit; one registered for correspondence; 2 took Learning Assistance for remedial mathematics; 4 jumped from Mathematics 8 to Mathematics 10A; one jumped to Mathematics 10 after completing Mathematics 8; and 3 others moved to Mathematics 9 without ever passing Mathematics 8 (the last 8 students will be discussed later in this chapter). In total, 34 students were removed from the initial group of 84 students who received incomplete standing in Mathematics 8 in the 92/93 school year.

Figure 4.1

Study Population

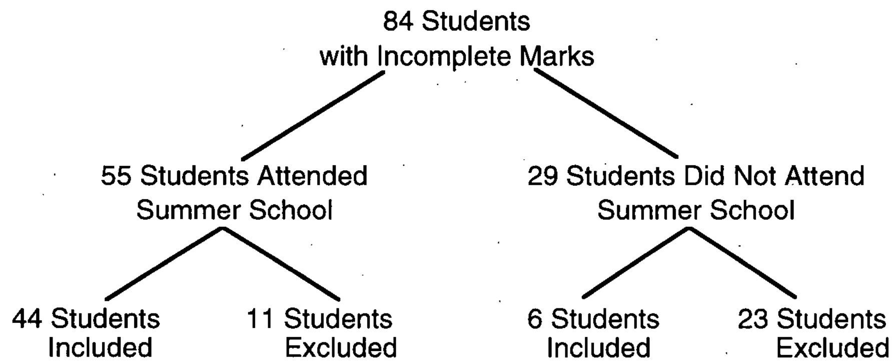
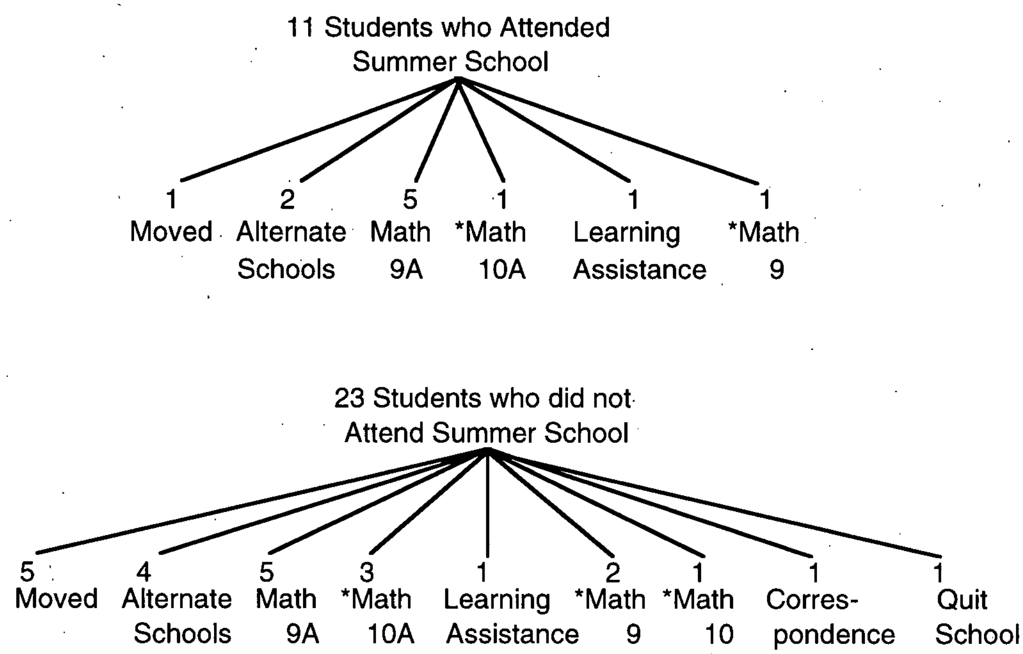


Figure 4.2

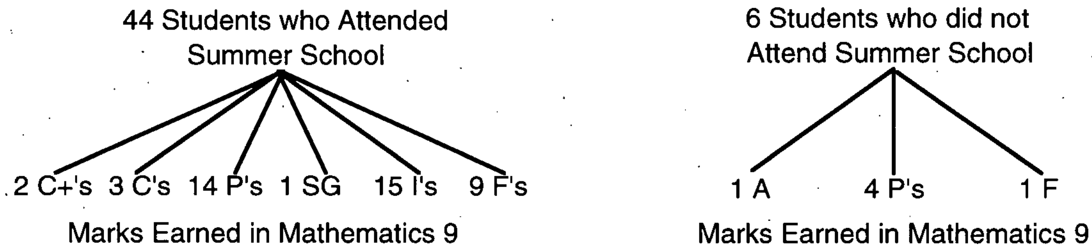
Excluded Students



*Socially Promoted

Figure 4.3

Included Students



The remaining 50 students were distributed among the three groups as follows:

Group 1: 6 students did not attend summer school; instead, they repeated a full year of Mathematics 8 before advancing to Mathematics 9,

Group 2: 44 students attended summer school and passed, and

Group 3: 0 students attended summer school and failed.

The Mathematics 9 marks of the 50 students who remained as the sample were as follows:

Group 1: 1 student earned an A, 4 students earned P's, and 1 received an F.

Group 2: 2 students earned C+'s, 3 earned C's, 14 earned P's, 1 received an SG, 15 received I's and 9 received F's.

The statistical tests that the researcher intended to perform, dependent samples t tests, proved impossible to conduct. Unequal group sizes and a nonexistent Group 3, made it impossible to follow through on the t tests to investigate any of the three null hypotheses. However, the data could still be analyzed using chi-square tests to provide evidence to support or refute the practice of remedial summer school as an alternative to retention.

$$\text{chi-square} = X^2 = \sum \frac{(f_o - f_e)^2}{f_e}$$

Of the original 84 students, 55 (65%) attended summer school and 29 (35%) did not. Eleven (20%) of the students who attended summer school were excluded from the sample because they enrolled in Mathematics 9A, enrolled in an alternate school, enrolled in Learning Assistance, or moved while 23 (79%) of the students who did not attend were excluded. A chi-square test for independence was conducted to determine if this difference was significant. The following null hypothesis was tested:

H_{O4} For students who received an incomplete mark in Mathematics 8, exclusion from the sample is independent of participation in summer school.

The observed and expected frequencies were as follows:

fo	SS	No SS
Excluded	11	23
Included	44	6

fe	SS	No SS
Excluded	22.26	11.74
Included	32.74	17.26

$X^2(1, n=84) = 27.72, p < 0.05$. The null hypothesis was rejected. A disproportionate number of excluded students occurs within the non-summer school group.

A chi-square test for independence was conducted to determine if there was a relationship between continued enrollment in the district and participation in summer school. The following null hypothesis was tested:

H_{O5} For students who received an incomplete mark in Mathematics 8, continued enrollment in the district is independent of participation in summer school.

The observed and expected frequencies were as follows:

fo	SS	No SS
Continued	54	22
Did Not	1	7

fe	SS	No SS
Continued	49.76	26.24
Did Not	5.24	2.76

$X^2(1, n=84) = 10.99, p < 0.05$. The null hypothesis was rejected. A disproportionate number of students who continued enrollment in the district occurs within the summer school group.

A more specific analysis was conducted using a chi-square test for independence to determine if there was a relationship between enrollment in Mathematics 9 and participation in summer school. The following null hypothesis was tested:

H_{06} For students who received an incomplete grade in Mathematics 8, enrollment in Mathematics 9 is independent of participation in summer school.

The observed and expected frequencies for the remaining 68 students were as follows:

fo	SS	No SS
Math 9	44	6
No Math 9	7	11

fe	SS	No SS
Math 9	37.5	12.5
No Math 9	13.5	4.5

X^2 (1, n=68) = 17.03, $p < 0.05$. The null hypothesis was rejected. Students who participated in summer school are more likely to enroll in Mathematics 9 in the next two years than students who do not participate in summer school. The population of 84 students who originally received an incomplete standing was reduced by 16 to examine this hypothesis: 6 who moved, 6 who enrolled in alternate schools, one who registered for correspondence, and 3 who advanced to Mathematics 9 without passing Mathematics 8. The 6 students who moved, the 6 who enrolled in alternate schools, and the one who registered for correspondence were removed from this analysis because it was unknown whether or not they registered for Mathematics 9. The 3 students who advanced to Mathematics 9 without passing Mathematics 8 were removed because they were socially promoted.

How students who received incomplete marks in Mathematics 8 eventually performed in Mathematics 9 is the subject of the following analyses.

As discussed earlier in this chapter, 50 students comprised the sample. Forty-four of the students successfully completed Mathematics 8 at summer school then advanced to Mathematics 9, but only 20 (45 %) were successful at earning passing marks. Six students did not attend summer school, but successfully completed Mathematics 8 in the 93/94 school year, then advanced to Mathematics 9. Five of the 6 (83 %) earned passing marks in Mathematics 9. It was impossible to conduct a chi-square test on this data because the resulting expected frequencies in two of the cells were too small for the test to be valid. The likelihood of committing a Type II error, failing to reject a false null hypothesis, was too great.

Of the 50 students in the sample, exactly half successfully completed Mathematics 9 (20 of the 44 students who attended summer school and 5 of the 6 students who did not). Stated another way, the failure rate for the sample for Mathematics 9 was 50%. A chi-square test for independence was conducted to determine if the failure rate in Mathematics 9 for the sample was different from the failure rate of the general population of Mathematics 9 students. The following null hypothesis was tested:

H_{07} There is no difference in failure rate for Mathematics 9 between students in the sample and the general population.

The observed and expected frequencies were as follows:

fo	Sample	General Population
Pass Ma 9	25	1279
Fail Ma 9	25	154

fe	Sample	General Population
Pass Ma 9	43.96	1260.04
Fail Ma 9	6.04	172.96

$X^2(1, n=1483) = 70.09$, $p< 0.05$. The null hypothesis was rejected. There is a significant difference in the Mathematics 9 failure rate between the students in the sample and the general population.

Further Analysis of the Data

The data analysis planned for this study intended to compare the Mathematics 9 achievement data for three groups of students who received incomplete marks in Mathematics 8 in the 92/93 school year. However, as explained earlier in the chapter, it was impossible to pursue the planned analysis using dependent samples t tests because of the small sample size, the unequal sizes of the groups, and the nonexistent third group.

In Chapter 3, threats to the validity of the study were discussed. Mortality was one of the threats and it was stated that a number of students had to be removed from the study because they either did not take Mathematics 9 or their Mathematics 9 marks were not available. An examination of the excluded students follows.

Excluded Students

Mortality. A total of 34 students were excluded from the sample in this study (40% of the eligible 84 students who received incomplete marks in Mathematics 8 in the 92/93 school year). The excluded group and the sample were initially similar in terms of Mathematics 8 achievement, both groups had received incomplete marks and were eligible for enrollment in summer school. However, only 11 of the 34 excluded students attended summer school (32%), compared to 44 of the 50 sample students (88%). As discussed above, this difference is significant [H_{O4} = X^2 (1, n=84) = 27.72, $p < 0.05$]. Another way of phrasing this finding is that a disproportionate number of summer school students remained in the sample. The researcher does not know why some students did not attend summer school. Expense was not a factor as fees were waived when requested. In fact, three students who remained in the sample had their fees waived (none of the excluded students attended summer school and had their fees waived). Some students may have had summer travel plans, some may have had job commitments, others may have felt the need for a break from school.

Analysis of differences between the excluded and included groups of students was restricted because available data were limited. It was possible, however, to investigate gender and age differences between the two groups.

The excluded group consisted of 21 males and 13 females while the included sample consisted of 34 males and 16 females The following null hypothesis was formulated to determine if the proportion of males to females was different in the groups:

H_{O8} There is no difference in the gender composition of the excluded and the included groups.

The observed and expected frequencies were as follows:

fo	Excluded	Included
Male	21	34
Female	13	16

fe	Excluded	Included
Male	22.26	32.74
Female	11.74	17.26

X^2 (1, n=84) = 0.35 , $p \nless 0.05$. The null hypothesis was not rejected. The difference in gender composition in the two groups is not significant.

The included group and the excluded group each contained 3 students who were at least one year older than their age cohort in the 92/93 school year. It was not possible to conduct a chi-square test because two of the expected frequency cells were less than five; the possibility of committing a Type II error was too great.

Analysis of Excluded Group. Thirty-four students were excluded from the sample. They were excluded for the following reasons:

- enrolled in Math 9A	10 students
- socially promoted	8 students
- moved out of district	6 students
- enrolled in alternate schools	6 students
- enrolled in learning assistance	2 students
- enrolled in correspondence school	1 student
- quit	1 student

Twenty-three of the 34 excluded students did not attend summer school while 11 did. The reasons they were excluded are outlined in the following paragraphs.

The 23 students excluded from the sample who did not attend summer school may have had some input into their educational program for the 93/94 school year and may have opted for alternate mathematics or alternate schools rather than repeat Mathematics 8. School counsellors together with administrators, classroom teachers, learning assistance and resource teachers meet as school-based teams and make recommendations for students who are having difficulties. Recommendations include alternate mathematics or alternate schools instead of repetition of Mathematics 8. Five of the 23 students did enroll in Mathematics 9A, 4 enrolled in alternate schools, and one enrolled in Learning Assistance for mathematics. Another 5 students moved out of the district, one registered for correspondence school, and one quit. The 6 remaining students were socially promoted (2 to Mathematics 9, 3 to Mathematics 10A, and one to Mathematics 10).

There were 11 students excluded from the sample who did attend summer school. Five of the 11 enrolled in Mathematics 9A, 2 enrolled in alternate schools, and one enrolled in Learning Assistance for mathematics. One student left the district and the remaining 2 students were socially promoted (one to Mathematics 9 and one to Mathematics 10A).

Socially Promoted Students. Social promotion, the advancement to a higher grade level without having met advancement criteria, was the reason 8 students were excluded from the sample.

Three students were excluded from the study because, although they did take Mathematics 9, they never successfully completed Mathematics 8. One of the 3 received an incomplete mark in Mathematics 8 in the 92/93 school year, enrolled in Mathematics 8 at summer school, but failed. He moved to Mathematics 9 in 93/94 without passing Mathematics 8. He received an F in Mathematics 9. Two others received incomplete marks in Mathematics 8 in the 92/93 school year, did not attend summer school, but advanced to Mathematics 9 in 93/94. They both earned P's in Mathematics 9. These advancements are consistent with social promotion because the students advanced with their age cohort despite the fact they had not met advancement criteria, i.e. successful completion of Mathematics 8.

Two different schools were involved in these three social promotion situations. In both schools, the counsellors explained that the social promotion decisions were made based on recommendations by the school-based team.

In one school, the school-based team had met frequently to formulate strategies to help the individual student be successful at school. The team determined that it was in the student's best interests to advance her to Mathematics 9 even though she had not passed Mathematics 8.

In the other school, Mathematics 9A was not offered due to insufficient enrollment (the only school of six in the district which did not offer Mathematics 9A; surprisingly, the one with the largest grade nine population). In addition, the counsellor explained that mathematics classes were paired with science classes. A mathematics and science pair was taught by a single teacher to a single set of students. Because mathematics and science were timetabled as a single course, a student who failed Mathematics 8 and Science 8 would most likely be required to repeat them both, but a student who failed one of the two subjects would most likely be advanced. The two students who were socially promoted to Mathematics 9 at this school were to be identified to their Mathematics 9 teachers and evaluated according to a modified curriculum as though they were in Mathematics 9A. It is unknown whether or not this occurred as their report card comments do not indicate modification took place. Out of 363 students enrolled in Mathematics 9 at this school in the 93/94 school year, 9 students (2%) did receive comments indicating their evaluation was based on a modified program. Interestingly, all 9 students on a modified program earned passing marks.

Four students were excluded from the sample because they jumped from Mathematics 8 to Mathematics 10A. They never took Mathematics 9 or 9A. One of these students received an incomplete mark in Mathematics 8 in June of 93, enrolled in Mathematics 8 at summer school in July 93 and failed. She repeated Mathematics 8 in the 93/94 school year and earned a passing mark. She then enrolled in Mathematics 10A in the 94/95 school year and earned a passing mark. The other 3 students who jumped to Mathematics 10A did not participate in summer school. Two of the 3 repeated Mathematics 8 in 93/94. One of the 2 passed, the other student received an incomplete mark. Both moved to Mathematics 10A in 94/95. The fourth student did not repeat Mathematics 8 in 93/94; instead she jumped to Mathematics 10A. However, her incomplete mark in Mathematics 8 in 93/94 was her second failing mark in Mathematics 8; she had taken the course in 91/92 for the first time. In all four of these situations, the students were advanced to Mathematics 10A without ever doing Mathematics 9 and the advancement allowed them to regain their position with their age cohort. The age cohort of each of the four students was enrolled in a grade ten mathematics course in the same year the four students were advanced. The advancement of the 4 students despite the fact that they had not taken Mathematics 9, and, in one case, had not successfully completed Mathematics 8, is consistent with the practice of social promotion. One of the 4 socially promoted students earned an A mark in Mathematics 10A, 2 earned P's, and the fourth student failed. Two different schools in the district enrolled these students and the decisions to socially promote the students were made consciously based on recommendations from the counsellors or school-based teams. The schools involved were not the same schools involved in the social promotions to Mathematics 9 described earlier.

A similar situation exists for another student who advanced from Mathematics 8 to Mathematics 10. She received an incomplete mark in Mathematics 8 in the 92/93 school year, did not go to summer school, repeated Mathematics 8 in 93/94 and earned a C+. In the 94/95 school year she advanced to Mathematics 10 where her age cohort was. She received an F in Mathematics 10. The school this student attended did not offer Mathematics 10A in the 94/95 school year (the same school which did not offer Mathematics 9A). The decision to promote the student was based on a recommendation from the school-based team. The student was to be on a modified program and evaluated as though she were taking Mathematics 10A. It is unknown whether or not this took place as her report card comment does not indicate any modification.

Eight social promotion cases are described here. In five of the eight cases, the students were successful at the higher level of mathematics; they passed. In three cases, the students were unsuccessful. Although it is impossible with this small number to conclude that social promotion is an effective practice, it did allow 5 of 8 students to successfully move ahead with their age cohort.

Related Study

The large number of excluded students was unexpected. The researcher was disappointed at not being able to follow through with the original data analysis using dependent samples t tests to examine the effectiveness of remedial summer school as an alternative to repetition of a course. The researcher, therefore, decided to examine other subject areas within one school in the district to assess the effect of summer school on subsequent achievement. The purpose of the related study was to provide evidence to support or refute the practice of remedial summer school as an alternative to subject repetition.

To provide the evidence, three parallel research questions were formulated investigating three different groups of students who received an incomplete mark in Science 8, Social Studies 8, or English 8 in the 92/93 school year: 1) students who did not attend summer school in July 93, 2) students who attended summer school and passed, and 3) students who attended summer school and failed. Science 8, Social Studies 8, and English 8 were chosen because they are academic compulsory courses that have grade 9 level compulsory courses to follow (hence the exclusion, for example, of French 8). Mathematics 8 was not included since it would have involved a duplication of data from the original study.

Three research questions, stated below as null hypotheses, were to be tested through the use of dependent samples t tests.

H_{011} There is no difference in Science 9, Social Studies 9, or English 9 achievement between students who passed Science 8, Social Studies 8, or English 8 at summer school and those who did not take summer school but passed Science 8, Social Studies 8, or English 8 after repeating the course(s) for a full year.

$H_{0}12$ There is no difference in Science 9, Social Studies 9, or English 9 achievement between students who passed Science 8, Social Studies 8, or English 8 at summer school and those who failed the course(s) at summer school.

$H_{0}13$ There is no difference in Science 9, Social Studies 9, or English 9 achievement between students who did not attend summer school and repeated Science 8, Social Studies 8, or English 8 for a full year and those who failed Science 8, Social Studies 8, or English 8 at summer school and repeated the course(s) for a full year.

Science 8, Social Studies 8, and English 8 incomplete marks for June 93 were gathered. Sixty-seven incomplete marks in Science 8, Social Studies 8, or English 8 were given in June 93. The 67 incomplete marks were earned by 51 individual students; 10 students received two incomplete marks and 3 students received three incomplete marks. These students were eligible for enrollment in summer school. Thirty-six students (representing 44 incomplete marks) enrolled while 15 (representing 22 incomplete marks) did not. The 51 students were responsible for 66 incomplete marks. The discrepancy of one incomplete mark exists because one of the 3 students who received three incomplete marks enrolled in summer school for two courses, but could not take a third course. Two courses are the maximum a student can take at summer school so it was impossible for her to enroll in summer school for the third course.

As in the main study, a number of students had to be excluded because grade 9 level marks were not available for them. There were a variety of reasons including movement from the district and enrollment in alternate schools or programs. A total of 20 students had to be excluded. The 31 remaining students (representing 37 incomplete marks) were divided into three groups as described above.

<u>Group 1:</u> 3 students (representing 3 marks) did not attend summer school; instead, they repeated a full year of the grade 8 level course before advancing to the grade 9 level,

<u>Group 2:</u> 27 students (representing 33 marks) attended summer school and passed, and

Group 3: 1 student (representing 1 mark) attended summer school and failed.

The grade 9 level marks of the 31 students (representing 37 marks) who remained as the sample were as follows:

Group 1: 1 C and 2 P's.

Group 2: 1 B, 2 C+'s, 5 C's, 8 P's, 11 I's, and 6 F's.

Group 3: 1 P.

Because of the unequal group sizes and the small numbers in Groups 1 and 3, it was impossible to conduct t tests to investigate the effects of remedial summer school on grade 9 level achievement. Since, as in the original study, the proposed statistical analysis could not be conducted no further analysis was done.

A summary of the original study, discussion of the results, and recommendations for future study and practice can be found in Chapter 5.

Chapter V

Summary, Discussion and Conclusions, and Recommendations

Summary

This study attempted to determine the effect of remedial summer school for Mathematics 8 on subsequent Mathematics 9 achievement to determine if remedial summer school was an effective alternative to subject repetition. All of the students in the district who received incomplete marks in Mathematics 8 in the 92/93 school year were eligible for the sample. There were 84 students who received incomplete marks.

Three research hypothesis were formulated and were to be tested using dependent samples t tests, however, it was impossible to complete these tests because of unequal group sizes, a small number of students in one group and a non-existent third group.

However, non-parametric analyses using chi-square tests were conducted on the data. The following null hypotheses were tested:

H_{O4} For students who received an incomplete mark in Mathematics 8, exclusion from the sample is independent of participation in summer school.

H_{O5} For students who received an incomplete mark in Mathematics 8, continued enrollment in the district is independent of participation in summer school.

H_{06} For students who received an incomplete grade in Mathematics 8, enrollment in Mathematics 9 is independent of participation in summer school.

H_{07} There is no difference in failure rate for Mathematics 9 between students in the sample and the general population.

Hypotheses H_{04}, H_{05}, H_{06}, and H_{07} were rejected. Students who participated in summer school had a smaller proportion of excluded students, a larger proportion of students who continued enrollment in the district, a larger proportion of students who enrolled in Mathematics 9, and a higher failure rate than the general population.

The researcher conducted a parallel related study to investigate the effect of remedial summer school on subsequent achievement in Science 9, Social Studies 9, or

English 9. All students in one school in the district who had received incomplete marks for Science 8, Social Studies 8, or English 8 in the 92/93 school year were eligible for the study. There were 51 students representing 67 incomplete marks. Null hypotheses analogous to H_{01}, H_{02}, and H_{03} were formulated. The hypotheses were to be tested using dependent samples t tests; however, as in the original study, it was impossible to complete these tests because of unequal group sizes.

Discussion

It was impossible to analyze the Mathematics 9 achievement of students who received incomplete marks in Mathematics 8 as originally planned using dependent samples t tests. However, chi-square tests yielded information useful to the purpose of the study, to provide evidence to support or refute the practice of remedial summer school as an alternative to repetition.

For students who received incomplete marks in Mathematics 8, those who participated in summer school were more likely to continue to be enrolled in the district [$H_{05} = X^2(1, n=84) = 10.99, p< 0.05$] and enrolled in Mathematics 9 [$H_{06} = X^2(1, n=68) = 17.03, p< 0.05$]. These findings demonstrate that summer school is an effective alternative to repetition for Mathematics 8 in terms of continued enrollment in the district and enrollment in Mathematics 9. It is possible that students who participate in summer school look forward to the social aspects of being enrolled with their age appropriate peers in Mathematics 9 while students who do not participate in summer school are not similarly motivated. Successful participation in remedial summer school allows students to advance with their age cohort to Mathematics 9. This is key. Cale (1992), as reported in Chapter 2, notes that students who successfully complete summer school are granted another opportunity to graduate with their peers.

Although summer school is positively related to continued enrollment in Mathematics 9, summer school is not related to passing marks in Mathematics 9. Fifty-five percent of the students who passed Mathematics 8 in summer school failed

Mathematics 9 the next year. Participation in summer school did <u>not</u> enable most students to successfully complete Mathematics 9.

When the successful completion rate, or inversely stated, the failure rate, for Mathematics 9 was compared between the sample and the general population a significant difference was found [$H_{07} = X^2(1, n=1323) = 70.18, p < 0.05$]. Students in the sample had a significantly higher proportion of failures in Mathematics 9 than the general population.

These findings, taken together, indicate that participation in summer school may help keep students enrolled in the district and in the regular mathematics stream, but not help them pass Mathematics 9. Participation in summer school for Mathematics 8 was not very useful to the successful completion of Mathematics 9.

These findings are generally consistent with the findings of studies reviewed in Chapter 2. Daniels (1986) found that students who attended summer school improved their school attendance the following year although there was no improvement in grade point average. Hink (1986) found that despite the fact that summer school students in her study showed no advantage over non-summer school students in report card grades, students felt that it was of benefit. Green (1989) reports no statistically significant differences between the achievement of students who attended summer school and those who did not, but he asserts that "the data ... appeared to indicate that the summer school program provided additional instruction in the basic skills which may have prevented the students who attended ... from falling further behind ... and being better prepared for the following year's instruction" (p. 73).

The social promotion cases described earlier suggest a question: why, if students can be successful in Mathematics 9 without ever passing Mathematics 8, even send students to summer school? Two students were socially promoted to Mathematics 9 after receiving incomplete marks in Mathematics 8 and not attending summer school. Both students were successful passing Mathematics 9. If students can pass Mathematics 9 without going to summer school or repeating Mathematics 8, why require the completion of Mathematics 8?

The social promotion decisions described earlier were all based on recommendations of the school counsellor or the school-based team. They were thoughtful recommendations based on the best interests of the individual student. The number of individual students discussed by school-based teams is unknown. What is known is that school-based teams recommend options other than social promotion. Their recommendations include summer school, alternate mathematics courses, learning assistance, and alternate schools. The question is, then, how do they determine which recommendation is in the best interests of the student? Would more students benefit from social promotion? It would be valuable to discover how school-based teams make their decisions and how they determine which students are even discussed. How are referrals to school-based teams made?

The large number of students that had to be excluded from the study because they did not continue to Mathematics 9 was unexpected. Although only one student was excluded because he dropped out of school altogether, others were excluded because they enrolled in Mathematics 9A, Learning Assistance, or alternate schools. It is possible that these students had learning difficulties that were not addressed in their Mathematics 8 course. This would be consistent with McLeskey and Grizzle's (1992) finding that a large number of students are retained before they are identified as having learning disabilities; McLeskey and Grizzle conclude that retention is being used as a remediation tool in the absence of other interventions. It is possible to draw the same conclusion from the findings of the present study. An obvious improvement to prevent retention being used as a remediation tool is to implement strategies to remediate students' learning difficulties prior to failure.

Identification of learning difficulties is crucial. Only after this occurs can remediation take place. After learning difficulties have been identified, strategies to meet the needs of students can be implemented. The *Special Education Services Manual of Policies, Procedures and Guidelines* (Ministry of Education, 1994) outlines strategies that can be used to assist students with special needs. The strategies listed in the manual fall under two categories: adapted and modified programs.

Adapted programs retain "the learning outcomes of the prescribed curriculum, but adaptations are provided so [students] can participate" (p. 8). Adaptations include changes to instructional strategies and assessment. Modified programs have "learning outcomes which are substantially different from the prescribed curriculum, and specifically selected to meet [students'] special needs" (p. 8). Adapted and modified programs are the responsibility of the classroom teacher with the support of resource personnel in the school and district. The intention is to provide an inclusive situation where all students can learn and achieve as their abilities permit. It is essential that classroom teachers understand their responsibility and facilitate the learning of all students.

The present study examined only students who received an incomplete mark in Mathematics 8. There were others who received a *Fail* mark. These students were excluded from the study because they were not eligible for summer school. However, considering the clearly negative findings of the retention literature, it is imperative that these students also be given an opportunity to catch up with their age cohort. They should be eligible for summer school.

In light of the results of the present study and the above discussion, recommendations for future research and future practice follow.

Recommendations for Future Research

Because there are unanswered questions raised by the present study, the following recommendations are suggested for future research.

1) Conduct the study and parametric data analysis as intended in the present study with a sample large enough to allow the use of dependent samples t tests. It is probable that provincial data would be required.

2) Determine why students do not take summer school. Are there differences between students who participate in summer school and those who do not?

3) Track students who move and who enroll in alternate schools to determine their achievement in subsequent mathematics courses.

4) Track students who received F letter grades in Mathematics 8. These students, unlike the ones in the present study, would not be eligible for summer school. They would be required to repeat a full year of Mathematics 8 before advancing to Mathematics 9.

5) Investigate the curriculum, teaching strategies, and evaluation of Mathematics 8 in remedial summer school. What are teachers of Mathematics 8 at remedial summer school trying to achieve?

6) Investigate the process schools use to determine which students should be socially promoted.

7) Track students who are socially promoted to determine their achievement in subsequent courses.

Recommendations for Future Practice

1) Permit students who receive *Fail* marks to attend summer school. This is likely only necessary for the 1996 summer school because *In Progress* will replace Fail beginning in the 1996-97. It makes sense that *In Progress* students would be able to complete their course requirements in summer school in the future.

2) Establish professional development opportunities for teachers to inform them of retention research findings.

3) Establish professional development opportunities for teachers to learn about adjusted and modified programs. With the support of resource personnel, assist teachers to alter their instructional techniques and assessment practices to be more inclusive of all students.

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