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THE KNOWLEDGE SURVEY: A TOOL FOR ARITHMETIC INTRACLASS GROUPING PRACTICES

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ABSTRACT

In this article a tool was designed and the main focus was to find the reasons for not grouping pupils during instructions in the elementary school. A questionnaire was planned and descriptive method were applied for fourteen open ended questions. The findings revealed that more favorable achievement results can be expected from arithmetic teaching as grouping practices move toward the individualized end of the continuum, also a list of nine criteria was compiled from the writings of professional elementary school educators and concluded many factors appear to contribute to a teacher's decision to use intraclass grouping for instruction in arithmetic are availability of teaching materials for use by subgroups, awareness of the existence in classroom of a wide range of pupil differences in arithmetic learning ability, teacher's interest in arithmetic as a subject, and availability of teacher time for lesson planning for subgroups. Some recommendations were suggested for elementary school administrators to improve the teaching of arithmetic.

Key words: Intraclass grouping, individualized instructions, learning ability, decision making.

1. INTRODUCTION

Considering the mathematics national curriculum recommended for elementary and middle classes, an extensive range of concepts are to be given and grasped by the students. Mathematics curriculum comprises of specific knowledge which requires positive approaches, frame of mind (analytical and logical thinking) and struggles for transforming to the students (Ellis, 2014; Government of Pakistan, 2006; Rojan, 2008). In many national, private and public schools in Pakistan teachers are commonly unsuccessful to instill and foster the serious attention towards learning mathematics in students. The result is that even after passing Grade 10 majority of students flop to sort any association with the subject (Government of Pakistan, 2009). Therefore the current study is designed to concentrate on individualization of teacher's instructional practice.

Intraclass grouping for reading instruction in the elementary schools is common practice. Individual pupil differences in arithmetic learning ability are in all probability as great as such differences in ability to learn to read. So a question arises about the extent of intraclass grouping for arithmetic instruction. If such grouping is not practice, what are the reasons?

2. PROBLEM

The study sought a solution to the problem, what should be approved plan of intraclass organization for instructions in arithmetic in the elementary school? It was determined from a survey of the literature that present organizational plans constitute a continuum ranging from the class as a whole procedure to individualized structure.

3. METHODOLOGY

A review of related research was made and data on arithmetic grouping practices was obtained from teachers in grades K-6 by means of a questionnaire. The sample included 2063 teachers in 156 government elementary schools in district Lahore. Usable questionnaires were returned by 1392, or 67 percent, of these teachers.

4. FINDINGS

After a review of related research and after a compilation of findings from the questionnaire responses, an attempt was made to answer fourteen questions. These questions and their answers, according to the researcher's interpretation of the data were following:

1. To what extent in grouping of pupils for arithmetic instruction practiced in Punjab's public elementary schools? 33 % of the teachers indicated that they grouped pupils for arithmetic instruction
2. Is grouping for arithmetic instruction considered by teachers to be relatively as important as grouping for reading instruction? The answer to this question was "no". Only 35 % of the teachers answering this question said "yes".
3. What is the relationship between teachers' interest in arithmetic and their arithmetic grouping practices? 39 % of those teachers reporting a "very high" interest in arithmetic as a subject said that they grouped pupils for arithmetic instruction, while only 26 % of those teachers reporting "average" interest in arithmetic used grouping
4. What is the relationship between teachers' academic qualifications and their arithmetic grouping practices? Percentages of teachers with college degrees reporting grouping for arithmetic instruction were M.Ed., 59 %; M.A., 39 %; B.A., 39 percent, and B.S., 32 %. Only 28 % of those with no degree reported grouping.
5. What is the relationship between teachers' years of experience and their arithmetic grouping practices? According to teacher responses, no apparent relationship exists.
6. What reasons do teachers give for not grouping pupils for arithmetic instruction? Six of the chief reasons checked on the questionnaire, in order of frequency, were;
 - a) Grouping requires more materials and textbooks than are available for me.
 - b) Grouping deprives the slow learner of stimulation from the fast learner.
 - c) Grouping requires too much teacher time for planning and correction work.
 - d) Grouping is not encouraged by my supervisor or principal.
 - e) Grouping increases disciplinary problems in the classroom.
 - f) Grouping is ineffective in the classroom.
7. What reasons do teachers give for grouping pupils for arithmetic? The four chief reasons checked in order of frequency, were;
 - a) Grouping aids in individualizing instruction.
 - b) Grouping helps build the slow learner's self-concept.
 - c) Grouping is effective in increasing pupils' arithmetic achievement scores.
 - d) Grouping makes teaching arithmetic less difficult.
8. On what basis are pupils placed in groups for arithmetic instruction? Bases checked on the questionnaire, in order of frequency, were;
 - a) Scores on teacher-made arithmetic tests.
 - b) Arithmetic achievement test scores.
 - c) Arithmetic grades.
 - d) IQ.
9. Into how many groups do teachers who group pupils for arithmetic instruction usually divide their classes? Number of groups used, in order of frequency, were: two, three, four, and more than four.
10. How do teachers who say that they group pupils for arithmetic instruction divide their teaching time between groups? Divisions of time checked, in order of frequency, were: equal time with all groups, most time with slow group, and most time with fast group.
11. What provisions do teachers make for pupil differences in learning arithmetic? Nine of the most frequently checked provisions, in order of frequency, were:
 - a) Provide individual help for pupils at their desks.
 - b) Provide individual help for pupils at teacher's desk
 - c) Permit individuals to help each other.
 - d) Prepare and duplicate special exercises for individuals.
 - e) Give individuals homework assignments to pupils.
 - f) Give individual classwork assignment to pupils.
 - g) Assign fast learners to help slow learners.
 - h) Assign fewer problems to the slow learners.

- i) Keep pupils after school and give them individual help.
12. Do the teachers who group pupils for arithmetic instruction indicate that they have sufficient time in which to prepare and duplicate needed special exercises for groups or individuals? 51 % of such teachers checked that they had ample time; however, several teachers made write-in comments to the effect that such work was performed at home and at school after school hours.
13. What do research findings collectively indicate concerning grouping pupils for arithmetic instruction? Intraclass ability grouping for instruction in arithmetic appears from the writings of educators to be approved practice. Brueckner (2012) attempted to determine by questionnaire the extent of the practice of this type of grouping in the elementary classrooms of the United States. He found that approximately 50 % of such classrooms were divided into two or more arithmetic ability groups. In a study limited to the state of Tennessee, Johnston (2013) found general failure to establish pupil groups for arithmetic instruction. Intraclass organizational practice reported in professional journals constitute a continuum ranging from the class-as-a-whole procedure to completely individualized instruction. Fourteen experimental studies of such grouping strongly indicate that more favorable achievement results can be expected from arithmetic teaching as grouping practices move toward the individualized end of the continuum.
14. What criteria have been established by professional elementary school educators as bases for evaluation of intraclass organization for instruction in arithmetic? A list of nine criteria was compiled from the writings of professional elementary school educators. The criteria are:
- A combination of subjective and objective criteria should be used as bases for establishing pupil groups.
 - Any plan of pupil grouping should be established for a purpose.
 - Flexibility in grouping should be maintained so that each pupil can work with the group which will most appropriately serve his needs, interests, and abilities.
 - Pupil grouping should provide for individual differences.
 - Pupils grouping should minimize loss of self-respect on the part of the "slow" pupils.
 - Intraclass grouping should not break up the unity of the total class group.
 - Pupil grouping should be accompanied by proper selection of content, methods, and materials.
 - Pupils grouping should encourage desirable interaction between pupils.
 - Pupils grouping should not make unreasonable demands for performance not yet justified by the maturity level of the pupils.

5. CONCLUSION

It appears reasonable to draw certain conclusions from the findings of the study, an examination of the related research, and a consideration of criteria established from the written options of professional educators. These conclusions are:

- The practice of grouping pupils for instruction in arithmetic within the elementary school classroom is sufficiently widespread (one out of three teachers do group) to merit further clarification of its contribution to the teaching-learning situation.
- Intraclass grouping of pupils for arithmetic instruction is desirable as a means of aiding the individualization of such instruction.
- A majority of the teachers who group pupils for arithmetic instruction believe that such grouping aids them in individualizing instruction in arithmetic.
- The teachers with high academic qualifications have a better understanding of learning principles as taught in instructions of higher learning and, therefore, see a greater need to individualize arithmetic instruction than do teachers with low academic qualifications.
- Teachers with a very high interest in arithmetic as a subject are more likely to group pupils for arithmetic instruction than are teachers without such an interest.
- The slow learners self- concept is a major concern of a majority of those teachers who group pupils for arithmetic instruction.
- The major factors that appear to contribute to a teacher's decision to use intraclass grouping for instruction in arithmetic are availability of teaching materials for use by subgroups, awareness of the existence in his

classroom of a wide range of pupil differences in arithmetic learning ability, teacher's interest in arithmetic as a subject, and availability of teacher time for lesson planning for subgroups.

8. Teachers who group pupils for arithmetic instruction tend to make more provisions for pupil differences in learning arithmetic than do teachers who do not group.
9. Many teachers do not feel that they have sufficient teaching materials available to permit them to provide materials for pupil groups in arithmetic.
10. When a school employs interclass ability grouping, some teachers in the school believe that the problem of individualizing instruction in arithmetic is minimized to the extent that a need to subgroup pupils does not exist.
11. Many teachers believe that more class time is required to teach subgroups than is required to teach the class-as-a-whole.
12. Grouping for arithmetic instruction is relatively as important as grouping for reading instruction, but a majority of government elementary school teachers do not have the professional understandings necessary to reach this conclusion.
13. Most teachers who group pupils for arithmetic instruction use only two groups.

RECOMMENDATIONS

The conclusions reached in this study were made after consideration of findings of experimental studies, the findings of this survey, and the criteria established from the written opinions of professional educators. Keeping these considerations in mind and drawing upon the researcher's own personal experience in teaching arithmetic in an elementary school classroom, certain recommendations to educators in teacher training institutions were formulated. These recommendations were made with the belief that their implementation will result in future elementary school teachers being better prepared to teach arithmetic to their pupils.

1. Pupil grouping for arithmetic instruction should be encouraged as an aid in individualizing instruction.
2. The major purpose of pupil grouping, to aid in the individualization of instruction, should be fully explained to teachers.
3. Teachers should be taught that it is important to teach arithmetic to each pupil at his level of understanding and, thus, help him progress at his maximum rate, whether or not a wide range of pupil arithmetic abilities exists in a particular classroom.
4. Teachers should be apprised of the fact that it is desirable to individualize instruction in arithmetic, but that this requires a considerable amount of teacher time and should be carried out only to the point where the total program will not suffer.
5. New teachers should be encouraged to use only two groups until they become acquainted with the problems of teaching in general and the problems of pupil grouping in particular.
6. The increased demand of pupil grouping on teacher time should be explored fully and explained to teachers.
7. Since many teachers indicate that they believe more class time is required for pupil groups than for the class-as-a-whole procedure, this idea should be explored and clarified.
8. Specific attention should be given to the problem of selecting arithmetic teaching materials for pupil subgroups.
9. Teachers should be encouraged to explain the idea of individual differences to their pupils so that pupils will not feel that they are being stigmatized by not always being in the top group.

To improve the teaching of arithmetic, elementary school administrators should consider the following list of recommendations. These recommendations could be implemented by administrators in the in-service training of groups of teachers and in the instruction of individual teachers.

1. Teachers should be encouraged to try arithmetic grouping, first on a limited basis and then as it appears advisable.
2. Teachers should be given help in obtaining suitable arithmetic teaching material for pupil grouping.
3. Teachers should be encouraged to exchange ideas on the utilization of pupil grouping for the teaching arithmetic.
4. Teachers should be encouraged to emphasize the importance of maximum pupil growth in arithmetic and to deemphasize the importance of pupils being in the top group.
5. Parents should be helped to understand the purpose of intraclass pupil grouping for instruction in arithmetic.

6. Teachers should be given clerical help with routine duties so that the teacher will have more time to plan and prepare arithmetic subgroup activities.

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