DOCUMENT RESUME

ED 349 951 IR 015 687

AUTHOR Baron, Lois J.; And Others
TITLE Cooperative Training in a Microcomputer Setting.
SPONS AGENCY Concordia Univ., Montreal (Quebec).; Social Sciences and Humanities Research Council of Canada, Ottawa (Ontario).
PUB DATE Apr 92
CONTRACT 410-87-0199
NOTE 15p.; Paper presented at the Annual Conference of the American Educational Research Association (San Francisco, CA, April 20-24, 1992).
PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Ability Grouping; Aptitude Treatment Interaction; *Computer Assisted Instruction; *Computer Software; *Cooperative Learning; Foreign Countries; Grade 5; Grade 6; Heterogeneous Grouping; Homogeneous Grouping; *Instructional Effectiveness; Intermediate Grades; *Intermode Differences; Microcomputers; Pretests Posttests

ABSTRACT

The purpose of this study was to examine the effects of both ability grouping and cooperative training on microcomputer learning at the upper elementary level using both drill and practice and tutorial software programs. A total of 263 grade 5 and 6 students participated in the study. Half of the group was trained on cooperative interpersonal skills prior to the treatment. Quads of either heterogeneously mixed subjects (high ability, high medium ability, low medium ability, low ability) or homogeneously mixed subjects worked on both software programs in a microcomputer laboratory. Posttest measures generally did not reveal ability grouping effects, nor were there differential results across the software types. Significant differences in the pretest measures across the training condition did not allow for direct comparisons, and separate analyses of the training conditions did not lead to differential trends across the two groups. These results have practical implications for those concerned with classroom ability grouping. (Author/ALF)

Cooperative Training in a Microcomputer Setting

Lois J. Baron, Ann Vergeylen,

Philip C. Abrami & Linda Wasserman

Concordia University

Montreal, Canada

Paper presented at the Annual Meeting of the American Educational Research Association, April 1992, San Francisco, CA.

This research was completed under funding by grants from the Social Science and Humanities Research Council of Canada (#410-87-0199) and Concordia University General Research Funds. The authors thank research assistant, Carol Shattner, for her work on the study, and extend our gratitude to Davidson & Associates and Hartley Courseware for generously supplying the software used in this project.

Correspondence concerning this article should be addressed to Dr. Lois J. Baron, Department of Education, Concordia University, 1455 de Maisonneuve West, Montreal, Quebec, Canada H3G 1M8.

Abstract

The purpose this study was to examine the effects of both ability grouping and cooperative training on microcomputer learning at the upper elementary level. The study was conducted using both drill and practice and tutorial software programs. Two hundred and sixty three, Grade 5 and 6 students participated in the study. Half the group was trained on cooperative interpersonal skills prior to the treatment. Quads of either heterogenously (high ability, high medium ability, low medium ability, low ability) or homogeneously mixed subjects worked on both software programs in a microcomputer laboratory. Posttest measures generally did not reveal ability grouping effects, nor were there differential results across the software types. Significant differences in the pretest measures across the training condition did not allow for direct comparisons. However, analyzing the training conditions separately did not lead to differential trends across the two groups. These results have practical implications for those concerned with classroom ability grouping.

Research has demonstrated that learning in groups does not hinder the supposed individualized learning effects of CAI (Baron & Abrami, in press-a, in press-b). The latter demonstrated that groups of four children can do as well as dyads and individuals on tests of achievement following a microcomputer learning experience with both drill and practice and tutorial software.

Research on classroom reward structures suggests that cooperative team learning techniques enhance student performance. In two studies (Johnson, Johnson, and Stanne, 1985, 1986), Grade 8 students were assigned to a cooperative, competitive or individualistic learning situation with the microcomputer. Results favored computer-assisted cooperative instruction. The effects of cooperative learning on students interpersonal skills seem especially encouraging since they may counterbalance any limitations of individualized CAI.

Of the eight studies on within-class ability grouping that Slavin (1987) reviewed, all showed trends indicating the positive effects of homogeneous grouping. There was no indication that ability grouping favored any one ability group over another although the median effect size for low ability subjects was higher than that for average or high ability students. It should be noted that grouping usually took into consideration level and pacing of instruction. In high school and college studies in which the material to be learned was the same for all ability groups, no significant differences between types of grouping were uncovered (Slavin).

The peer tutoring literature has shown that both the tutor and tutee benefit from the social interactions inherent to peer tutoring arrangements. Heterogeneous groupings provide more opportunities for such interactions. High and low ability students in heterogeneous groups have more opportunities to respectively give or receive help leading to more effective learning. In contrast, medium ability subjects in homogeneous groups have been shown to outperform their counterparts working in heterogeneous groups (Webb, 1982).

The nature and context of the instructional processes inherent to learning in homogeneous or heterogeneous groups may mediate the effects of grouping (Gamoran, 1987). Microcomputer learning is still a fairly new context in which group learning can take place.

Hooper and Hannafin (1988) studied the effects of heterogeneous versus homogeneous grouping of Grade 8 students in a cooperative, tutorial, microcomputer learning context. No significant differences between groups or for the ability X grouping interaction surfaced; however, trends indicated that low ability subjects grouped heterogeneously consistently outperformed their homogeneously grouped counterparts.

An alternative to ability grouping is cooperative learning. Slavin (1990) found that in 57 per cent of reported studies, cooperative learning methods led to significant differences in achievement over traditional learning. The research indicates that cooperative learning techniques are of benefit to all ability students (Slavin). His motivationalist viewpoint is in contrast to the developmentalist perspective which supports the premise that peer interaction in and of itself is effective. The purpose of the reported work was to continue investigating group microcomputer learning and the product or outcome of this intervention, with particular emphasis on student achievement. More specifically, the purpose of this research was to investigate whether cooperative training would enhance group microcomputer learning, the effects of different ability groupings on microcomputer learning and to examine the above questions with different types of software. There has not been one reported study investigating the effects of cooperative microcomputer learning or different CAI ability grouping configurations at the elementary level.

METHOD

Subjects

Subjects included 263 mixed gender, Grade 5 and Grade 6 students from four schools in the Montreal area.

Materials

A drill and practice software program, Word Attack, and a tutorial software program, Analogies Tutorial.

Procedure

Classes were randomly assigned to either a cooperatively-trained or non-trained group. Cooperative training (six classes) consisted of three, one-half hours. Students were then assigned in groups of four, by classroom, to either a high ability, medium-high ability, medium-low ability or low ability group. Ability levels were determined by pretesting children on the Basic Word Vocabulary Test (BWVT). At least one mixed ability group was formed per classroom unit. There were 21 mixed ability groups (81 subjects).

Pretests included BWVT and Analogies Pretest scores. All subjects participated (in their assigned groups) in five, one-half hour microcomputer sessions.

Posttests were given on completion of each software type. They included 1. an Analogies Test based on concepts taught in the Analogies Tutorial, 2. a Word Attack Multiple Choice Test, 3. a Word Attack Sentence Completion Test and

4. a Word Attack Word Definition Test based on the words and vocabulary building skills taught in Word Attack.

RESULTS

The design was a 2 (GRADE) X 2 (TRAINED) X 4 (ABILITY) X 2 (GROUP COMPOSITION). Analyses of pretest scores using the Analogies pre-test as a dependent variable revealed a main effect for ABILITY, $F(3, 242) = 18.97$, $p<.000$, in the expected direction and a GRADE X TRAINED interaction, $F(1, 242) = 5.97$, $p<.05$. The trained group scored higher in the Grade 6 sample, but not significantly so while the untrained group in the Grade 5 sample significantly outperformed the trained group on the Analogies pretest measure, $F(1, 122) = 4.82$, $p<.03$.

Similarly, analyses of pretest scores on the BWVT revealed a main effect for GRADE in the expected direction, $F(1, 242) = 131.36$, $p<.000$ and ABILITY as expected, $F(3,242) = 271.83$, $p<.000$. GRADE X TRAINED was also significant, $F(1, 242) = 30.04$, $p<.000$, with the untrained Grade 5 subjects significantly outperforming the trained subjects, $F(1, 122) =20.74$, $p<.000$ while the reverse was true of Grade 6 students, $F(1, 120) = 9.98$, $p<.002$.

The initial GRADE X TRAINING interaction led to performing separate analyses on the trained and untrained groups by grade level. For this reason, the effects of cooperative training on microcomputer learning cannot be directly addressed. The results of the analyses are found in Tables 1 and 2.

Discussion

Results of this work demonstrated that ability grouping did not differentially affect achievement for all levels of ability and grade levels. In addition, the types of achievement measured by the different Word Attack tests were generally not differentially affected by grouping. Software type did not differentially affect results. These results were consistent for both cooperatively trained and untrained groups.

Homogeneous and heterogeneous groupings on the microcomputer generally did not make a difference. The presence of low ability students in a group did not affect the achievement of higher ability students. On the other hand, the performance of low ability students was not enhanced by the presence of high ability students. It is possible that the task may have been simple enough for all ability groups such that ability grouping was not an intervening factor in the learning process. That is, the nature of the task or perhaps the microcomputer learning context may have reduced any effects that differences in ability may have caused.

In addition, as Slavin (1990) has suggested, perhaps the subjects should have been grouped according to their scores on the Analogy Pretest as opposed to the general ability measure. According to Slavin, grouping on a particular skill leads to true heterogeneity within groups.

Future research should also focus on what actually happens in groups as they interact in a microcomputer learning environment. Little research of this nature has been performed at the elementary level. This study should also be replicated taking into account the problems of assignment encountered in this work.

Finally, this research has demonstrated that ability grouping does not make a difference. Acknowledging the fact that there are external validity concerns with research of this nature, one must also take into account the social-emotional factors associated with those labelled "low ability" children. The issues of mainstreaming and ability grouping are sensitive ones. The results of studies examining such issues have practical implications, but as educational researchers, we must not lose sight of the fact that the subjects we are studying are children.

References

Baron, L. & Abrami, P. (in press-a). The effects of group size and exposure time on microcomputer learning. Computers and Human Behavior, 8.

Baron, L. & Abrami, P. (in press-b). Microcomputer learning with a tutorial program--manipulating group size and exposure time. Manuscript submitted for publication.

Johnson, R., Johnson, D., & Stanne, M. (1985). Effects of cooperative, competitive, and individualistic goal structures on computer-assisted instruction. Journal of Educational Psychology, 77(6), 668-677.

Johnson, R., Johnson, D., & Stanne, M. (1986). Comparison of computer-assisted cooperative, competitive, and individualistic learning. American Educational Research Journal, 23(30),382-392.

Gamoran, A. (1987). Organization, instruction, and the effects of ability grouping: Comment on Slavin's "Best-Evidence Synthesis". Review of Educational Research, 57(3), 341-345.

Hooper, S. & Hannafin, M. (1988). Cooperative cbl: The effects of heterogeneous versus homogeneous grouping on the learning of progressively complex concepts. Journal of Educational Computing Research, 4(4), 1988.

Slavin, R. (1987). Ability grouping and student achievement in elementary schools: A best-evidence synthesis. Review of Educational Research, 57(3), 293-336.

Slavin, R. (1990). Co-operative learning. In C. Rogers & P. Kutnick (Eds.). The social psychology of the primary school (pp. 226-246). London: Routledge.

Webb, N. (1982). Peer interaction and learning in cooperative small groups. Journal of Educational Psychology, 74, 642-655.

Table 1

Mean Posttest Scores of Trained Students as a Function of Grade and Group Type

Grade	5		6	
Ach Tests	Hom.	Het.	Hom.	Het.
Anal. Post				
M	29.63	34.26[t]	39.51	39.05
SD	10.96	9.39	6.54	7.58
MCWA				
M	15.85	16.05	21.42	22.20
SD	6.06	4.95	4.43	4.49
Def. Test				
M	6.78	6.19	10.04	12.85
SD	6.27	4.59	6.00	5.70
Sent. Test				
M	4.88	3.57	9.35	8.30
SD	5.63	3.52	5.20	5.63

[a] n=263

[t] $p<.10$

Table 2 Mean Posttest Scores of Untrained Students as a Function of Grade and Group Type

Grade	5		6	
Ach Tests	Hom.	Het.	Hom.	Het.
Anal. Post				
M	35.66	37.80	38.79	37.47
SD	9.91	7.31	6.61	9.73
MCWA				
M	18.66	16.84	19.82	22.21*
SD	5.16	6.34	4.97	2.89
Def. Test				
M	9.72	8.84	9.92	10.58
SD	5.64	5.41	5.89	4.71
Sent. Test				
M	9.15	6.37[t]	10.05	11.42
SD	5.60	5.30	4.65	4.62

[a] $n=263$

*$p<.05$

[t] $p<.10$