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ABSTRACT

Research on perceived locus of control indicates that there is a positive correlation between internal locus of control and a variety of cognitive behaviors associated with academic achievement, that the perceived locus of control of educationally disadvantaged students is more external than average, and that the perceived locus of control of such students can be made more internal through intervention. Findings also suggest that computer based instruction (CBI) classroom environments that are student-centered and cooperative, and promote individualized instruction, may change the perceived locus of control of the students involved to one in which they believe themselves to be more in control of their own learning. Analyses of interviews conducted with 197 teachers and 718 students participating in New York City's Computer Pilot Program for educationally disadvantaged students in grades 3-12, the standardized test scores of 3,795 students, and classroom observations support the efficacy of CBI for the delivery of basic skills remediation to these students. It is suggested that the success of the CBI programs evaluated is derived at least in part from the effects of the CAI environment on the students' perceptions of control over their own learning. (28 references) (DB)

PERCEIVED LOCUS OF CONTROL AND COMPUTER-BASED INSTRUCTION

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Abstract

The Computer Pilot Program is an on-going project designed to explore the use of comprehensive computer based instructional systems (CBI) for the remediation of basic skills deficiencies among educationally disadvantaged students in New York City's public school system. To date, interviews have been conducted with 197 teachers and 718 students participating in the program and the standardized test scores of 3,795 students have been included in analyses of 14 different systems placed in 12 elementary, 8 junior high/intermediate, and 12 high schools located throughout New York City. The results of these analyses support the efficacy of CBI for the delivery of basic skills remediation to educationally disadvantaged student populations. Our findings also suggest that the use of comprehensive CBI is indeed altering the ways in which teachers teach and students learn. We found that the computer based classroom environments we visited were more student-centered and cooperative, that teachers were more the facilitators of learning and that learning was more individualized when done using computers, and that students were more motivated and less threatened when learning on computers than when learning in regular classroom settings.

In particular, we found that (1) the majority of students involved in the Computer Pilot Program believe themselves to be more in control of their own learning when learning on computers, and that (2) the environments of the computer rooms in which they worked supported such belief. Research on perceived locus of control indicates that there is a positive correlation between internal locus of control and a variety of cognitive behaviors associated with academic achievement, that the perceived locus of control of educationally disadvantaged students is more external than average, and that the perceived locus of control of such students can be made more internal through intervention. It is our belief that the use of CBI in itself may be changing the perceived locus of control of students involved with it, moreover, that the success of the CBI programs we evaluated derives at least in part from the effects of such environments on the perceptions of control over their own learning of the students involved with them. As such populations are arguably in the greatest need of this sort of intervention, changes in perceived locus of control resulting from CBI use might be far more significant in the long run than any short-term achievement gains it affords.

Background

Perceived locus of control refers to an individual's expectations concerning whether rewards and punishments are contingent on her own behaviors (internal locus of control) or upon the behaviors of powerful others, fate, or chance (external locus of control). Research in this area indicates a positive correlation between internal locus of control and a variety of cognitive behaviors associated with academic achievement – better assimilation and use of information (Seeman, 1963; Phares, 1968), attentiveness and flexibility of attention (Rotter & Mulry, 1965; Julian & Katz, 1968; Lefcourt & Wine, 1969); deferred gratification (Bialer, 1961; Franklin, 1963; Mischel, Zeiss & Zeiss, 1974), curiosity and intrinsic motivation (Baron & Ganz, 1972; Wolk & DuCette, 1974; Dollinger & Taub, 1977; Stewart & Moore, 1978) – as well as with academic achievement itself (McGhee & Crandall, 1968; Lessing, 1969; Bar-Tal & Bar-Zohar, 1977; Gordon, 1977). Researchers have also found that minority and disadvantaged populations are more external in their perceptions of control than general populations (Battle & Rotter, 1963; Lefcourt & Ladwig, 1965; Jessor, Graves, Hanson & Jessor, 1968; Duke & Lancaster, 1976).

The positive relationships between academic success and internality on the one hand, and disadvantaged populations and externality on the other, have led several investigators to develop interventions which have successfully changed the perception of control among disadvantaged students to a more internal locus (Reimanis, 1971; Dweck & Reppucci, 1973; Lynch, Ogg & Christensen, 1975; Duke, Johnson & Nowicki, 1977). DeCharms (1981), in particular, developed one such intervention, and, in a five-year longitudinal study, was able to demonstrate links between that intervention and greater internality, between the intervention and academic success, and between greater internality, academic success, and greater actual student control of individual classroom environments. DeCharm's work is particularly meaningful in that his "personal causation training" was able to arrest the increasing discrepancy usually found between the academic performances of inner city students and national norms for advancing grade levels. Moreover, students participating in his interventions maintained achievement levels equal to national norms well after the intervention period.

The research reported in this paper is concerned with changes in the perceived locus of control of educationally disadvantaged students resulting from the use of computer-based instruction (CBI). In our interviews with students participating in New York City's Computer Pilot Program, we were impressed by how many stated that what they liked best about CBI was that it put them in control of their own learning (Guerrero, Swan, & Mitrani, 1989). "You choose your own subject," "You work by yourself," and "I don't need a teacher," were among their answers to this question. "You're like the teacher," one student said. Extrapolating from deCharm's (1981) finding that classroom environments influence internality, we reasoned that CBI might be positively influencing the internality of students involved with it, and that such change might be even more important to those students than any short term achievement gains it afforded them. We resolved, therefore, to determine: (1) whether the majority of students involved in the Computer Pilot Program did, in fact, believe themselves to be more in control of their own learning when learning on computers, and (2) whether the environments of the computer rooms in which they worked actually supported such belief.

Methodology

The Computer Pilot Program is an on-going project of the Division of Computer Information Services of the New York City Board of Education. Its goals are to identify comprehensive CBI programs which can be effective in increasing the academic performance, attendance, and positive attitudes of educationally disadvantaged New York City public school students in grades three through twelve, and to isolate implementation factors significantly influencing program and/or implementation effectiveness (Guerrero, Swan, & Mitrani, 1989). During the 1987-88 school year thirteen comprehensive CBI programs -- Autoskills, CCC, CCP, CNS, Degem, ESC, Ideal, PALS, PC Class, Plato, Prescription Learning, Wasatch, and WICAT -- were evaluated in ten elementary, seven intermediate, and nine high schools located throughout the New York City school system. During the 1988-89 school year, seven comprehensive CBI programs -- CNS, Ideal, New Century, PALS, Prescription Learning, Wasatch, and WICAT -- were evaluated in two elementary, one intermediate, and four high schools. CBI programs were donated, installed, and maintained by their vendors, who were also responsible for training the participating staff members at the schools in which they were placed. At each site, a program coordinator was selected by the school to be responsible for the daily operation of the program. Each school was also responsible for selecting a target group of educationally disadvantaged students in need of basic reading and/or mathematics remediation, and for scheduling that group in compliance with the stated needs of the vendors.

In the spring of 1989, we interviewed a sample of students at each school participating in the Computer Pilot Program during that school year. Open-ended interviews were conducted with whole classes participating in the program to determine students' responses to it. In addition, students were asked to individually complete two written questionnaires. The first of these was designed to corroborate and quantify information gained in the open-ended interviews. The second questionnaire was designed to determine how the students believed learning on computers differed from regular classroom instruction. It consisted of eleven questions to which students were to answer either "more," "less," or "about the same." Included among these was, "Do you believe that you are more or less in control of your own learning when using computers?" Ninety-nine students completed this second questionnaire. Student responses to each question were tabulated and the percentage of students responding with each choice calculated.

Observations of students and teachers using CBI were also conducted in each participating school, and the same students were observed during regular classroom activities. Whenever possible, regular classroom observations also included the same teachers as observed in the computer room, but in some cases this was not possible because CBI teachers never left the computer room. The regular classroom activities observed were none-the-less concerned with content similar to that addressed by the CBI programs evaluated (reading and mathematics). Observations lasted fifteen minutes, and consisted of the recording of all student-teacher interactions occurring during that period of time. These were characterized as either student-initiated or teacher-initiated, whole group or individual, and involved with either content or process questions. The total number of interactions in each category was tabulated and used to calculate ratios of teacher-initiated to student-initiated, whole group to individual, and content to process interactions for both CBI and regular classroom instruction. The significance of differences in interactions between computer and regular classrooms was assessed using a chi-square analysis.

In addition, empirical analyses of student performance gains were made using comparisons of participating students' percentile scores on citywide tests given in 1987, 1988 and 1989. Spring reading and mathematics performance scores were compared for the year preceding and the year of students' participation in the Computer Pilot Program. Tests used were the Degrees of Reading Power (DRP), and the Metropolitan Achievement Test (MAT). The scores of 2417 participating students were included in the analyses of reading achievement (1057, elementary; 631 intermediate; 459, high school) and the scores of 1639 participating students were included in the analyses of mathematics achievement (1068, elementary; 561, intermediate). Matched t-tests were used to test for significant differences between students 1987 and 1988, or 1988 and 1989, reading and mathematics scores, and effect sizes for the mean differences between these generated.

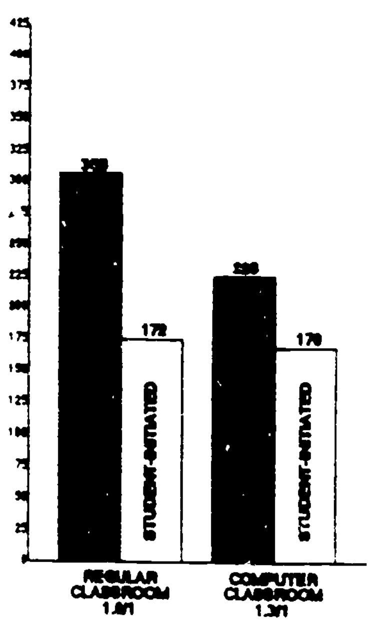
Results

Our findings suggest that the use of comprehensive CBI is altering the ways in which teachers teach and students learn. We found that the computer based classroom environments we visited were more student-centered and cooperative, that teachers were more the facilitators of learning and that learning was more individualized when done using computers, and that students were more motivated and less threatened when learning on computers than when learning in regular classroom settings (Guerrero, Swan & Mitrani, 1989b). In particular, we found that the majority of students involved in the Computer Pilot Program did believe themselves to be more in control of their own learning when learning on computers, and that the environments of the computer rooms in which they worked supported such belief.

Sixty-three percent of the students we interviewed believed that they were more in control of their own learning when learning on computers than when learning in a regular classroom, while only thirteen percent believed that they were less in control. Twenty-four percent thought they had about the same amount of control over learning from CBI as they had over regular classroom learning. These results corroborate the findings of the open-ended interviews. They indicate that the majority of students involved in the Computer Pilot Program indeed believed they were more in control of their own learning when using CBI than during regular classroom instruction. We can conclude, then that students' perceived locus of control was more internal during computer-based learning than during their regular academic activities.

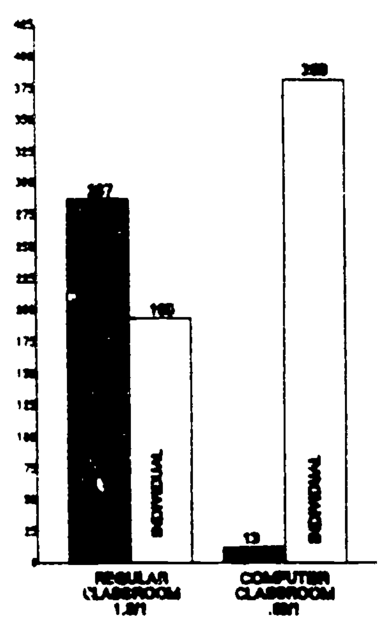
A chi-square analysis of the initiation of interactions in regular and computer-based classrooms reveals significant differences between the two (X^2 [1,5] = 56, $p < .001$). Figure 1 shows the overall ratio of teacher-initiated to student-initiated interactions observed in regular and computer classrooms in the schools we visited during the 1988-89 school year. We found 309 teacher-initiated interactions and 172 student-initiated interactions in regular classrooms as compared with 226 teacher-initiated interactions and 170 student-initiated interactions in computer classrooms. The ratio of teacher to student initiation was 1.8/1 in regular classrooms and 1.3/1 in computer rooms. These results show that although the numbers of student-initiated interactions were about the same during regular and computer-based instruction, there were more teacher-initiated interactions in regular classrooms.

Figure 1
Ratio of Teacher-Initiated to Student-Initiated Interactions in Regular and Computer Classrooms



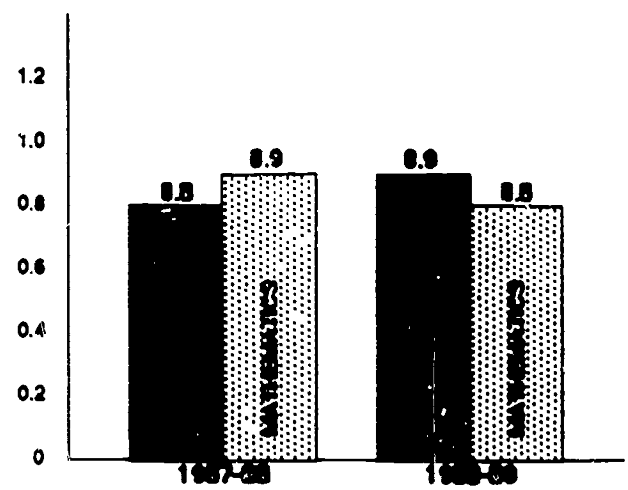
We also found significant differences between whole group and individual interactions in regular and computer-based classrooms ($X^2 = 375$, $p < .001$). In regular classrooms, we found 287 whole group interactions and 195 individual interactions, while there were only 13 whole group interactions as compared to 383 individual interactions in computer classrooms. The ratio of whole group to individual interactions was 1.5/1 in regular classrooms and 0.3/1 in computer classrooms (Figure 2). Results thus reveal that the overwhelming majority of interactions occurring during CBI were individual, whereas the majority of interactions occurring during regular classroom instruction were whole group, a factor which may have contributed to students' perceptions of greater control. These findings indicate that over and above the perceived control over their interactions with the computers, students, in fact, had more control over their interactions with their teachers during computer-based learning. We can conclude, then, that student perceptions of greater control of their own learning when learning on computers were well founded.

Figure 2
Ratio of Group to Individual Interactions in Regular and Computer Classrooms



The results of the empirical analyses of student achievement support the efficacy of CBI for the delivery of basic skills remediation to educationally disadvantaged student populations. They indicate that involvement with CBI programs can result in significant and meaningful increases in the academic performance of educationally disadvantaged students, and that CBI can be equally effective in increasing both their reading and mathematics performance scores (Guerrero, Swan & Mitrani, 1989a). Figure 3 shows the overall achievement gains of participating students in terms of effect sizes for the 1987-88 and 1988-89 school years (an effect size of 1.0 indicates gains of a full standard deviation).

Figure 3
Overall Achievement Gains
1987-88 and 1988-89 Evaluations



Conclusions

Our research findings reveal that (1) the majority of students involved in the Computer Pilot Program did believe themselves to be more in control of their own learning when learning on computers, and that (2) the environments of the computer rooms in which they worked supported such belief. Empirical analyses of student achievement gains, moreover, demonstrate significant and meaningful increases in students' academic performance resulting from their participation in the Computer Pilot Program. Such results parallel deCharm's (1981) findings linking greater internality of perceived locus of control, greater actual student control of individual classroom environments, and increased academic achievement. It would seem that computer-based instruction in itself can in some sense facilitate students' increased perceptions of control over learning without any specific intervention designed to do so, at least among the educationally disadvantaged student populations we tested. As such populations are arguably in the greatest need of this sort of intervention, changes in perceived locus of control resulting from CBI use might be far more significant in the long run than any short-term achievement gains it affords.

The research reported in this paper is, of course, preliminary, but it clearly argues for further investigations of the effects of computer-based learning on the perceived locus of control of educationally disadvantaged students. If the use of computer-based instruction can change the perception of control among such populations toward a more internal locus, and if CBI can effect such changes intrinsically without any additional interventions specifically designed to do so, then a strong argument, over and above any arguments based on short-term academic gains, can be made its use with educationally disadvantaged students.

References

Baron, R. M. & Ganz, R. L. (1972) Effects of locus of control and type of feedback on the task performance of lower class black children. *Journal of Personality and Social Psychology, 21*, 124-130.

Bar-Tal, D. 7 Bar-Zohar, Y. (1977) The relationship between perception of locus control and academic achievement. *Contemporary Educational Psychology, 2*, 181-199.

Battle, E. & Rotter, J. B. (1963) Children's feelings of personal control as related to social class and ethnic groups. *Journal of Personality, 31*, 482-490.

Bailer, I. (1961) Conceptualization of success and failure in mentally retarded and normal children. *Journal of Personality, 29*, 303-320.

deCharms, R. (1981) Personal causation and locus of control. In H. M. Lefcourt (Ed.) *Research With the Locus of Control Construct, Vol. 1: Assessment Methods*. New York: Academic Press.

Dollinger, S. J. & Taub, S. I. (1977) The interaction of locus of control expectancies and providing purpose on children's motivation. *Journal of Research in Personality, 11*, 118-127.

Duke, M., Johnson, T. C. & Nowicki, S. (1977) Effects of sports fitness camp experience on locus of control orientation in children, ages 6 to 14. *The Research Quarterly, 48*, 280-283.

Duke, M. P. & Lancaster, W. (1976) A note on locus of control as a function of father absence. *The Journal of Genetic Psychology, 129*, 335-336.

Duke, M. P. & Lewis, G. (1979) The measurement of locus of control in black preschool and primary school. *Journal of Personality Assessment, 43*, 351-355.

Dweck, C. S. & Reppucci, N. D. (1973) Learned helplessness and reinforcement responsibility in children. *Journal of Personality and Social Psychology, 25*, 109-116.

Guerrero, F., Swan, K. & Mitrani, M. (1989a) *Computer Pilot Program 1987-88* (Evaluation Section Report). New York: Instructional Evaluation Unit, Department of Research, Evaluation, and Assessment, New York City Board of Education.

Guerrero, F., Swan, K. & Mitrani, M. (1989b) *Computer Pilot Program 1988-89* (Evaluation Section Report). New York: Instructional Evaluation Unit, Department of Research, Evaluation, and Assessment, New York City Board of Education.

Gordon, D. A. (1977) Children's beliefs in internal-external control and self esteem as related to academic achievement. *Journal of Personality Assessment, 41*, 383-386.

Jessor, R., Graves, T. D. & Jessor, S. (1968) *Society, Personality and Deviant Behavior*. New York: Holt, Rinehart & Winston.

Julian, J. W. & Katz, S. B. (1968) Internal versus external control and the value of reinforcement. *Journal of Personality and Social Psychology, 76*, 43-48.

Lefcourt, H. M. & Ladwig, G. W. (1965) The American Negro: a problem in expectancies. *Journal of Personality and Social Psychology, 1*, 377-380.

Lefcourt, H. M. & Wine, J. (1969) Internal versus external control of reinforcement and the deployment of attention in experimental situations. *Canadian Journal of Behavioral Science, 1*, 167-181.

Lessing, E. E. (1969) Racial differences in indices of ego functioning relevant to academic achievement. *Journal of Genetic Psychology, 115*, 153-167.

Lynch, M. L., Ogg, W. D. & Christensen, M. G. (1975) Impact of a life planning workshop on perceived locus of control. *Psychological Reports, 37*, 1219-1222.

McGhee, P. E. & Crandall, V. C. (1968) Beliefs in internal-external control of reinforcement and academic performance. *Child Development, 39*, 91-102.

Mischel, W., Zeiss, R. & Zeiss, A. (1974) An internal-external control test for young children. *Journal of Personality and Social Psychology, 29*, 265-278.

Phares, E. J. (1968) Differential utilization of information as a function of internal-external control. *Journal of Personality, 36*, 649-662.

Reimanis, G. (1973) School performance, intelligence, and locus of reinforcement control scales. *Psychology in the Schools, 10*, 207-211.

Rotter, J. B. & Mulry, R. C. (1965) Internal versus external control of reinforcements and decision time. *Journal of Personality and Social Psychology, 2*, 598-604.

Seeman, M. (1963) Alienation and social learning in a reformatory. *American Journal of Sociology, 69*, 270-284.

Stewart, J. E. & Moore, K. P. (1978) Time perception as a function of locus of control. *Personality and Social Psychology Bulletin, 4*, 56-58.

Swan, K., Mitrani, M., Guerrero, F. & Schoener, J. (1989) Honing in on the target: the use of CBI with educationally disadvantaged students. Paper presented at the Annual Meeting of the American Educational Research Association, San Francisco.

Wolk, S. & DuCette, J. (1973) The moderating effect of locus of control in relation to achievement-motivation variables. *Journal of Personality, 41*, 59-70.