INSTRUMENTAL ENRICHMENT RESEARCH

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The Foundational Study

A study that established the foundation of Instrumental Enrichment (IE) research was conducted by Feuerstein and his colleagues with a population of five hundred socially and culturally disadvantaged Israeli adolescents (Feuerstein et al, 1980; Rand, Tannenbaum, & Feuerstein, 1979) The main research hypothesis was that cognitive performance and school achievement of students who receive two years of the IE program will be higher than those of the matching groups of students who receive the same amount of general enrichment lessons. The pre- and post-test measures included Thurstoneís Primary Mental Abilities Test and a specially designed curriculum-based Achievement Battery. The results confirmed the main hypothesis: IE group students showed significantly better results on the post-tests. In the cognitive area better results were achieved in spatial relations, figure grouping, numbers, and addition sub-tests. In the curriculum based tasks IE group students performed significantly better in Geometry and Bible studies. A follow-up study (Rand et al, 1981) conducted two years after the end of IE intervention demonstrated that IE group students continued to perform better that control group students in both verbal and non-verbal cognitive tests.

A large scale external validation of the IE program

While the foundational study described above was conducted by the authors of the IE program, the first large scale external validation study of the effects of IE was conducted in Venezuela (Ruiz, 1985; see also Savell, Twohig, & Rachford, 1986). In this study adolescent students from higher and lower socio-economic status (SES) groups participated for two years in the IE program. The effectiveness of the IE program was assessed with the help of pre-and post tests of general intellectual abilities (Cattell-2), academic performance in mathematics and language, and in self-concept. The experimental IE group (318 students) was compared to the control group of equal size. Statistically significant gains for the IE group were observed in all three spheres: general intellectual abilities, academic performance and the self-concept. Before intervention higher-SES group showed higher results in all three spheres. Some difference remained after intervention, but both groups improved their performance. As to intellectual abilities, both groups benefited equally, while in academic performance the high-SES group benefited more. It is interesting that pre-test differences in self-concept disappeared after intervention. A follow-up study was undertaken by Ruiz two years later using a non-verbal intelligence test of Lorge-Thorndike. Both low and high-SES students from the IE groups continued to outperform students from the control group.

Learning disabled students

In the US a large scale systematic attempt to evaluate the effect of the IE program on learning disabled students was undertaken by Jensen and Singer (1987). The target group in this study included 13-17 year old socially disadvantaged special education students whose average baseline IQ was 74-76. Altogether 142 students participated in the mid-point testing, and 121 at the end of the study. Students from the control group received a regular special education curriculum. The studentsí performance data were analyzed in terms of acquisition, near transfer, and far transfer.

The mid-point examination revealed that those students who received one year or less of IE outperformed, on a statistically significant level, the control group in acquisition and near transfer, but not in far transfer. Those students who at the mid-point had more than one year of IE outperformed the control group in all three categories. This result not only substantiated the authorsí general hypothesis, but also confirmed earlier observations that the true benefits of the IE program for special education students should not be expected until the second year of the enrichment program. The end of the study testing produced similar results but with one important exception. In the math test IE students showed no advantage over the control group students. This discrepancy in the far transfer results posed a more fundamental question of the relationship between cognitive modification associated with IE and performance in the academic content areas. It would be naive to expect dramatic changes in students' academic performance if the regular curriculum is not coordinated with the IE program. The authors suggested that the failure of the IE program to consistently influence the far transfer is associated with the absence of a coherent special education curriculum in the schools where the research project was carried out. The authors conclude that, as scissors indeed have two blades, the effective functioning of the child will require both good cognitive skills and a knowledge base on which they can be applied (Jensen, 1990). One of the major problems in the application of IE with learning disabled or/and socially disadvantaged populations lies in the fact that often content learning does not provide the necessary support for developing cognitive functions. When a student does not receive material to which the "bridging" from IE can be done, there is little hope for progress in content areas. One of the primary tasks of the IE program when applied to learning disabled children is the remediation of deficient cognitive functions. Therefore, the researcherís task is not only to ascertain the effect of IE as manifested in the gross improvement in the intellective and motivational spheres, but also to identify changes in specific cognitive functions. This has been done by Beasley (1984; see also Shayer & Beasley,1987). Deficient functions were identified with the help of the Learning Potential Assessment Device procedure before and after the 18 months of IE intervention. Altogether 14 cognitive functions belonging to the Input (3), Elaboration (6) and Output (5) phases were assessed. It was discovered that learning disabled students who received IE indeed showed significant improvement in terms of cognitive functions. Particularly significant improvement was observed in the need for logical evidence. Another important parameter discovered in the Shayer and Beasley study was the relative improvement in standard and mediated performance on the Raven Matrices test. Students who received IE (experimental group) and the control group were pre- and post-tested with the Raven Matrices test both under mediated learning assessment conditions and standard conditions. Pre- and post-tests were one year apart. The results of the test were expressed in mental age units. The difference for the experimental group between standard pre-and post-test was 1.9 years, while for the control group it was 1.0 year. The difference for the experimental group between the mediated pre- and post-test was 1.7 years while for the control group it was 0.2.

years. These data indicate that the experimental group not only improved its performance under standard conditions, but what is more important it significantly increased its ability to learn and benefit from assistance. This can be expressed in Vygotsky's terminology as a significant advancement of the upper limit of the Zone of Proximal Development.

The quality of mediation

The quality of teacher's mediation constitutes the major factor determining the outcome of the IE program. This thesis was confirmed in a study conducted by Alvarez et al (1994). The IE program was taught to a group of 123 low achieving students from 5, 6, and 7 grades in Puerto Rico's public schools. The control group received an ordinary enrichment program. Experienced IE counselors visited each participating school at least eight times and evaluated the teacher's style and mediational input with the help of a special MLE rating scale. Pre- and post-testing of experimental and control groups included Raven Standard Matrices and the Cattell's Intelligence Test. The authors report a statistically significant difference between experimental and control groups in the intellectual performance at the post-test. A more important difference however was revealed between the performance of students in different IE groups. The performance of groups that received IE with appropriate mediation was contrasted with those which received inappropriate mediations as judged by IE-counselors' reports. Statistically significant differences were found in the performance of these two groups, especially as measured by Cattell Tests. Thus the difference in the performance of students who received appropriate mediation of IE and the performance of the control group is even greater than previously thought.

Conclusion

Only some of the more salient features of the IE research are outlined here. One may however draw certain conclusions regarding the optimal conditions for the implementation of IE programs:
a) The length of the intervention should be at least two years;
b) A wide range of IE instruments should be used;
c) Teachers' mediation style should be monitored by experienced IE counselors.

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