

CHAPTER 5

DISCUSSION

5.1 Conclusion and Discussion

The major finding of the present investigation indicates that the PEM method is appropriate for a quantitative synthesis of single-subject researches. The PEM scores correlate closely with the primary authors' judgments and are not influenced by outliers in the baseline. In addition, there are only 4 figures that displayed orthogonal slope changes in the second pair of baseline-treatment phases, i.e., in Figure 1 of the study conducted by Hasazi and Hasazi (1972); Figure 2 of the study by Howell, Sidorenko, and Jurica (1987); Figure 1 of the study by Lahey, McNees, and Brown (1973); and in a graph for subject 2 in Figure 1 of the study by Olympia, Sheridan, Jenson, and Andrews (1994). The appearance of orthogonal slope change in the second pair of baseline-treatment phases is not obvious that agrees with the finding of Scruggs, Mastropieri, and Casto (1985-1986).

A possible explanation for the relatively high correlation between PEM scores and primary authors' judgments is that primary authors may be more likely to generate cheerful conclusions. And the PEM Method is more likely to commit Type I error than the PND method.

Further, the analysis shows that behavioral modification has a positive effect on academic behaviors. Many strategies have been employed to enhance academic behaviors including: (a) computer assisted instruction; (b) cooperative learning; (c) mastery learning; (d) reinforcement; (e) self-control training; (f) situated learning; (g) social learning; (h) strategy instruction; and (i) others. The various kinds of interventions have shown moderate to extreme effects on participants' academic behaviors. Of all the interventions, mastery learning, reinforcement, and self-control training yield more notable effectiveness. In addition, the influence of computer assisted instruction, cooperative learning, reinforcement, and self-control training on academic engagement are relatively large compared to those on academic achievement. But the effectiveness of social learning on academic engagement are relatively small compared to those on academic achievement.

Several studies employing between-group meta-analysis have revealed similar conclusions. Guskey and Pigott (1988) conducted a quantitative synthesis on the use of mastery learning strategies. A total of 78 effect sizes from 43 studies showed mastery learning strategies have positive effects on student achievement. Kulik et al. (1990) also explored the effectiveness of mastery learning programs by using a meta-analysis. The average effect size of mastery learning programs on examination performance was .52. That is, mastery learning programs have positive effects on

academic achievement. In addition, Lysakowski and Walberg (1981) examined the effects of reinforcement on classroom learning by conducting a meta-analysis. The results showed that the mean of 102 effect sizes from 39 studies was 1.2 and this result suggests that reinforcement has a strong effect on learning. Fletcher-Flinn and Gravatt (1995) collected 120 studies published from 1987-1992 for a meta-analysis on the effectiveness of computer assisted instruction. It was found that the averaged effect size of computer assisted instruction was .24 with a standard deviation of .53. This finding indicates that computer assisted instruction can benefit academic performance. Schmidt et al. (1985-1986) employed a meta-analysis to examine the effects of computer-assisted instruction for exceptional children. A total of 16 studies were used to assess effect sizes. The results indicated that computer-assisted instruction has a moderate effect in improving participants' learning.

Across different participants characteristics and context characteristics, similar results were gained. First, the intervention have moderate effects no matter the sex and classification of participants. There were also no difference among all educational level except college. Second, obvious effects appeared under all academic subjects except educational psychology. The slight effects associated with participants in colleges and within educational psychology course may be attributed to bias samples. In the same way, the intervention have similar effects within various settings and

intervenors. One of the outcomes was that apparent effectiveness appeared in home settings and when participants' parents acted as agents to enhance academic behaviors. This finding implies that parents play an important role in behavioral modification of their children. Fan and Chen (2001) conducted a between-group meta-analytic study to investigate the relationship between parental involvement and students' academic achievement. Their findings indicate that parental involvement has a positive influence on students' academic achievement.

5.2 Limitation and Recommendation

These results should be viewed within the limitations of the meta-analysis method employed. First, it is difficult to collect unpublished studies, so the present synthetic analysis focuses only on published literature. The inclusion of unpublished studies may produce different outcomes for treatment effectiveness.

Second, the number of effect sizes of subcategories are unequal and the homogeneity of variance assumption may be infringed, hence, it is not easy to compare the effectiveness from diverse subcategories meaningfully. Furthermore, there are several subcategories with a small number of effect sizes. This brings the predicament that the number of effect sizes within some cells is too few for the interaction effect to be assessed.

Future researches can concentrate on finding ways to identify which intervention procedures are more appropriate for particular participants under particular contexts. Besides, future studies can focus on exploring which conditions such as the variability of behavioral change are more appropriate to use the PND statistics than to use the PEM statistics.