



San Antonio

This study was designed to determine if differences exist in the academic performance and/or retention levels of students taught using The 4MAT Model when compared to students taught using a traditional or non-specified teaching methodology. As demonstrated by the data reported, the over-all performance of the 4MAT groups was superior to the performance of the non-4MAT control groups.

Especially noteworthy are comparisons of gain scores on a measure of academic performance in which three out of four 4MAT groups outperformed their non-4MAT cohorts.

Comparisons of retention scores, also strongly favor 4MAT classes. In four out of four paired comparisons the 4MAT group outperformed their Control counterparts. For two of the four comparisons, group one and group three, these differences were statistically significant. It is also noteworthy that in comparisons of academic gain group two outperformed the 4MAT group, yet for retention the 4MAT group slightly outperformed Control group two.

Using an analysis of covariance procedure to analyze gain score for a content measure these data are equally supportive of 4MAT effects. Three out of four comparisons of post-tests reveal that the 4MAT classes report higher raw and adjusted means than did their matched control classes.

On the covariant analysis of retention of a content measure results were equally demonstrative with three of the four 4MAT groups outperforming the control pairings, with group four showing statistically significant gains.

When comparisons of gain score (pre to post) are further defined using student performance on a standardized reading measure, comparisons by quartile consistently favor the 4MAT groups. Particularly noteworthy here is the performance of the first, or lowest, quartile. These students, often identified as “at risk,” show a gain of at least 50 points or more in three of the four 4MAT groups. Only groups one and three of the control groups had students scoring at or below the 25th percentile (quartile one) and of these only group three had a gain exceeding 50 points.

For overall comparisons by quartile, of the fourteen comparisons, eleven of the 4MAT groups achieved 50 points or higher, compared to eight of the Control.

The results of this study are particularly important in that the gains reported by the experimental /4MAT students were accomplished in classes that were equally, if not slightly more supported as demonstrated by student perceptions of social support reported in Table 8.

As evidenced by these data, and the data on quartile grouping in which a large number of the lower quartile populations were in the 4MAT groups (see table 4) the 4MAT group performance would not be predicted.

This study clearly supports that as a tool for improving student performance, 4MAT appropriately implemented, can have striking effects upon student academics gain and retention.

To obtain a copy of this complete study, please call About Learning, Inc. at 800-822-4MAT.

Paterson New Jersey

This study was also designed to determine if differences exist in the academic performance and/or retention levels of students taught using The 4MAT Model when compared to students taught using a traditional or non-specified teaching methodology. As demonstrated by the data reported, the over-all performance of the 4MAT pairings was superior to the performance of the non-4MAT control groups.

Especially noteworthy are comparisons of gain scores on a measure of academic performance in which six out of eight 4MAT groups significantly out performed their non-4MAT cohorts.

Using an analysis of covariance procedure these data are more striking. Eight out of eight comparisons of post-tests reveal that the 4MAT classes report higher raw and adjusted means than did their matched control classes. Five out of the eight post-tests comparisons were statistically significant in the direction of the 4MAT pairing.

In the analysis of retention scores, 4MAT classes had higher raw means in eight out of eight comparisons than control classes. In seven out of eight comparisons, 4MAT classes had higher adjusted means than control classes. Four out of the eight adjusted mean comparisons were statistically significant.

For retention of a content measure the results were less demonstrative with three of the 4MAT groups demonstrating significant gains. In the control population only one group showed a significant gain while two groups showed a negative gain in retention.

4MAT classes had higher raw means in eight out of eight comparisons than control classes. In seven out of eight comparisons, 4MAT classes had higher adjusted means than control classes. Four out of the eight adjusted mean comparisons were statistically significant.

The results of this study are particularly important in that the gains reported by the experimental /4MAT teachers were accomplished, not in a lab school setting, but in a school district which is, by most standards, very challenging. The fact that Paterson Public Schools, by mandate, have been taken over by the state of New Jersey in an effort to correct long-standing deficiencies speaks for itself. However, in spite of those deficiencies, this study demonstrates that teachers, adequately trained and supported can make a difference. This study also clearly supports that as a tool for improving student performance, 4MAT appropriately implemented, can have striking effects upon student academics gain and retention.

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Brain Studies

Research on hemispheric specialization and brain function support the following:

- The hemispheres of the human brain process information and experience in identifiably different ways.
- The neural organization in each hemisphere is complementary, yet different.
- The Corpus Callosum, the bundle of nerve fibers connecting the two hemispheres, serves to integrate the functions of the hemispheres.
- Hemispheric dispositions (preference) are identifiable.
- Individual preference for hemispheric integration has a supportable relationship to cognitive processing style, especially with regard to new learning.
- Brain research supports the belief that traditional education favors an all too narrow approach to teaching. Our “at-risk” students may be at risk due to our teaching methodologies rather than from any innate deficiencies of their own.
- Research on the effects of right and left mode instruction indicates that students differ with regard to hemispheric dominance, and that these differences influence student retention and performance.

Knowledge about the specialization of brain function has led to several hypotheses about how teaching and learning might be improved. In this regard, the guiding principle of the 4MAT Model is:

“Meaningful teaching is teaching which systematically engages both hemispheres of the brain in problem-solving and understanding.”

Teachers and Teaching

It has been clearly demonstrated that parents’ education and income influence student performance in schools. These are variables which the schools cannot change. The research findings of teacher effects upon student learning, however, reveal the existence of several variables and conditions of learning which schools and teachers can act upon to have powerful effects upon student learning and performance. These are called “actionable variables.”

These variables illustrate:

- There are identifiable aspects of teaching and instruction which clearly influence student’s performance on academic tasks.
- A demonstrative relationship exists between specific teacher behaviors and successful student performance.
- Teacher sense of efficacy is significantly related to student achievement. This sense of personal power is not a fixed construct, but rather is negotiated daily and thrives in organizational structures with warm, accepting climates, climates where teachers work in teams and have decision-making power.
- Multiple methods of instruction connected to personal meaning, including strivings and self-discoveries, are related to higher levels of students’ performance and integrated learning.
- A classroom is an interactive environment within which every variable influences every other variable. Thus, in order to be successful, any effort at restructuring schools must give attention to the entire learning environment.

Expert Learners

The nature of intelligence and the personal attributes of expert learners have long been subjects of inquiry for education researchers. And although similarities in metacognition exist as indicators of advanced thinking, specific applications for teaching continue to resist precise definitions. In the absence of validated application models, interpretations of research findings, particularly Resnick's composite on higher order thinking and the work of the Dreyfus brothers on "those who excel," hold promise for teachers and teaching.

According to Resnick, "the most important single message of modern research on the nature of thinking is that the kinds of activities traditionally associated with thinking are not limited to advanced levels of development."

This assertion that higher order thinking skills are not hierarchical is revolutionary. This claim has a significant impact on pedagogy. For example, if classrooms, especially at elementary levels, cultivated these aspects of thinking into everyday teaching, it would be the basis of a new paradigm.

We believe that the following research-derived list of characteristics of expert learners illustrates clearly the cyclical nature of learning. Expert learners:

- Connect new experiences to past experiences thereby imposing personal meaning on what they learn
- Understand content at the conceptual level
- Reason by analogy to other similar situations
- Recognize past patterns and experiences and use gut reactions to respond
- Elaborate and reconstruct problems into new forms
- Search for consistencies and inconsistencies in proposed solutions
- Test implications of initial ideas and make modifications
- Use new learning creatively in actual life
- Move from subjectivity (what one senses and feels)...to objectivity (what the experts know and what one analyzes things to be)...to integration (what one adapts and incorporates into one's life)

Change and Restructuring

4MAT, a model for organizing and actualizing change processes in schools, is particularly useful in the creation of a culture of educational effectiveness. 4MAT methods and objectives, consistent with the research data cited below, are intended to change a school by changing the behaviors of the people vital to that school, beginning with its teachers. 4MAT also provides an organizational framework for dealing with a system: from building community and morale, to creating structures that are consistent with the school's mission, to managing operations and finding the resources to accomplish that mission and finally to building a dynamic culture through continuous evaluating and refocusing.

After only two decades of serious research on change processes in schools, several pointed findings emerge. These findings, which form the basis of this restructuring design, include the following:

- Change projects in schools can be successful. There exists a strong base of evidence about how and why educational reform fails or succeeds, a specific set of research-derived Do's and Don'ts.

Research Summary

- The creation of an open, trusting climate and better relationships must be the beginning of any successful system change.
- Organization structure, operational procedures, and evaluation techniques must be congruent with the stated mission and values of the school.
- Positive educational change begins with teachers. Without their willing participation, change efforts usually fail.
- Adult learners become meaningfully involved when recognized and given increased responsibility.
- Successful change involves changing the culture of the organization.