

The Impact of Learning Styles on High Stakes Testing: Perspectives from Mississippi Delta Area Teachers

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Abstract

The purpose of this study was to explore the extent to which teachers in the Mississippi Delta were addressing learning styles at the middle school level. The evaluation addressed methods used to identify learning styles, the impact of learning styles on academic performance, the extent to which learning styles were addressed in school improvement and lesson plans, and instructional delivery and assessment. Data was obtained from questionnaires, classroom observations, review of school improvement and lesson plans, interviews and the Mississippi Curriculum Test. The evaluation found all surveyed teachers (1) addressing learning styles to some extent, (2) reporting increasing academic performance, and (3) making a special effort to develop corresponding activities to enhance learning.

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Introduction

At one time or another, all instructional methods have been criticized, and as professionals we are called upon time after time to defend our teaching methodologies (Dunn & Dunn, 1978). This call may be because it has become obvious that many instructional methods that are highly effective for some students are not appropriate for others. Upon entering our classrooms, in many ways, the students appear to be very much alike; their ages are nearly the same, they have similar interests, and they study common subjects. Rather, a closer look reveals many diverse individuals (Snowman & Biehler, 2003), not only in terms of ethnicity, gender, age, nationality, and cultural background, but also and most important, how each individual learns.

Learning styles are defined by Snow, Corno and Jackson (1996) as students' approaches to learning, problem solving, and processing information. The challenge of today's schools is to assess each child's learning style characteristics and to provide teaching interventions that are compatible with those traits (Griggs, 1991). Diagnosing and interpreting learning styles provide important data as to how individuals perceive, interact with, and respond to the learning environment (Griggs, 1991). Moreover, according to Reiff (1992), diagnosis can provide teachers with theory and knowledge

upon which to make more informed decisions about instructional methods. As we focus on our own style of learning, it makes us aware of the interventions that we tend to favor over others, thus accommodating some styles that are similar to our own and possibly, without being aware, alienating others who have different learning styles (Griggs, 1991). The literature seems to suggest that diagnosing students learning styles can be an easy and effective process because students can identify their own learning styles and score higher on tests when they are complimented with a teaching style that matches their learning style. These findings may serve to be important in the mist of high stakes testing.

According to Eggen and Kauchak (2004), the concept of learning styles has at least three implications for teachers. First, learning styles can remind educators that they need to vary instructions (Shuell, 1996). Activities such as individual projects, small-group discussions, cooperative learning, and learning centers provide flexibility in meeting individual needs. Second, the concept of learning style should remind educators of the need to help students become more aware of the ways they most effectively learn (Eggen & Kauchak, 2004). Sternberg (1998) linked learner self-awareness to intelligent behavior. Third, the concept of learning style should remind educators that students are different and that they should increase their sensitivity to those differences. With increased sensitivity, educators are more likely to respond to students as individuals (Eggen & Kauchak, 2004).

Many types of learning styles have been introduced; however, Kolb (1984) identified three of the most popular types of learners and described some ways in which they learn. First, the visual learner within Kolb's paradigm prefers to learn through written language, such as reading and writing tasks. This learner usually remembers what has been written down even if it has only been read once. Information typically does not exist for a visual learner unless the information is written down. Visual learners make up about 65% of the population (Mind Tools, 2000). Next, the auditory learner is more at ease with the spoken word or language. They usually talk to themselves and read information out loud. This type of learner may listen to a lecture and write down notes afterward. Written information has no meaning to these individuals unless they have heard it. Auditory learners make up about 30% of the population (Mind Tools, 2000). Finally, the kinesthetic learner effectively learns through touch, movement and space while their skills are learned through imitation and practice. This type of learner tends to lose concentration when little or no movement exists and may appear to be slow, especially when information is not presented in a style that compliments their learning style. Kinesthetic learners make up about 5% of the population (Mind Tools, 2000).

The successful education of students is currently under a microscope. As a result, low academic achievement and low test scores are blamed on the school, teachers, and the instructional programs or methods being used. Schroeder (1996) suggests that educators expound on the amount of learning activities open to them which may greatly increase their satisfaction and students' learning. Schroeder believes that engaging in such a process that clearly indicates that there are many paths to excellence can help meet the needs of students. In addition, this process may serve to take some of the burden off schools and their faculty.

The purpose of this evaluation was to explore the extent to which teachers are addressing learning styles at the middle school level for students enrolled in mathematic courses. This evaluation sought to discover if teachers' understanding of learning styles are fundamental to their individual approaches to teaching and does the use of learning styles have a positive impact on student's test performance, therefore, allowing educational professionals to be responsive to a more diverse student body. The results will add to the literature concerning the importance of using learning styles to achieve academic success of students in Mississippi. This evaluation addressed the following six questions:

1. To what extent are school improvement plans addressing learning styles of middle school math students?
2. How do teachers use learning styles to plan instruction?
3. How do teachers use learning styles to deliver instruction?
4. How do teachers use learning styles to assess students' achievement?
5. What methods are teachers using to identify learning styles?
6. What impact does the use of learning styles have on mathematics performance?

Methods

Participants were selected from middle schools in Mississippi. Participants consisted of middle school mathematics teachers from Mississippi Delta Area schools. One hundred seventy-one teachers were selected from a list of Mississippi Schools provided by the Mississippi Department of Education. The schools are classified as either rural, outside a metropolitan statistical area, inside metropolitan statistical area, small town, large town, urban fringe of large city, urban fringe of mid-size city.

Instrumentation

A mixed methods evaluation was designed to answer the evaluation questions. Mathematics teachers in the targeted middle schools were asked to complete a questionnaire, agree to an interview and permit a classroom observation to determine how learning styles are being addressed. A closed-form questionnaire was developed

specifically for this evaluation. The questionnaire was designed to measure the opinions of middle school mathematics teachers regarding the use of learning styles in planning and delivering instruction, and assessing student performance. The questionnaire consisted of 15 questions/statements and consumed an estimated 15 minutes of the teacher's time to complete.

Participants responded to questions pertaining to years of experience, certification, grade level taught, definition of learning styles, extent to which learning styles are addressed in school improvement plans, extent to which learning styles are addressed in lesson plans, extent to which learning styles are addressed when delivering instructions, extent to which learning styles are addressed when assessing mathematics achievement, methods used to identify learning styles, impact of learning styles on student's mathematics performance, training in the use of learning styles, rationale for addressing learning styles, addressing learning styles if more training was provided, and a classroom observation. Responses from middle school mathematics teachers provided information from one of the most important sources related to this issue. Fifty-seven out of one hundred seventy-one questionnaires were returned.

In collecting the data, all participants met the only requirements needed to participate in the study "they were middle school mathematics teachers within schools located in the Mississippi Delta." Participants were delivered questionnaires through regular mail. Cover letters accompanied the questionnaires. Upon completion of the questionnaires, teachers were asked to return their responses in the self-addressed envelopes provided. In an attempt to increase the response rate, a follow-up was conducted. Required data were collected from questions answered on the closed-form questionnaires. The closed-form questionnaire was used for the purpose of ensuring opinionated responses. On using a closed-form questionnaire Borg and Gall (1983) states "the questions permit only certain responses so that qualification and analysis of the results may be carried out efficiently" (p. 419). Returned questionnaires were reviewed and analyzed. Charts, tables and percentages were used in describing the data.

Classroom Observation

Classroom observations were conducted in order to explain how middle school mathematics teachers were addressing learning styles to a high extent. From the returned questionnaires, a three-step selection process was used to select the schools to be visited for conducting interviews, classroom observations, and reviewing relevant documents (i.e., lesson plans). First, questionnaires were assigned case numbers for identification purpose. Cases were eliminated from the observation if the total score of survey questions 7, 8, and 9 was less than 9. Of the 57 useable questionnaires, 13 teachers had a total score of 9 on the three questions. Of the 13, only 6 indicated, on the questionnaire, that the evaluator could conduct a classroom observation.

Using the Mississippi Curriculum Test (MCT) 2003-2004, test data were collected on the 13 cases and a comparison was made on the combined proficient and advanced scores. The final selection of schools included the top four cases having the highest combined proficient and advanced student scores in the area of math and agreeing to the classroom observation (see Table 1).

Table 1
Proficiency Level Distribution 2003-2004

C A S E #	Percentage of Students Scoring Minimal, Basic, Proficient or Advanced in the Areas of Math on the Mississippi Curriculum Test (2003-2004)						
	SUBJECT	NUM	MEAN	<---PROFICIENCY LEVEL DISTRIBUTION--->			
	GRADE		SS	MINIMAL	BASIC	PROFICIENT	ADVANCED
	=====	=====	=====	=====	=====	=====	=====
19	GRADE 6	134	560.3	17.9%	11.2%	33.6%	37.3%
	GRADE 7	145	569.3	26.9%	14.5%	33.1%	25.5%
44	GRADE 6	55	553.4	14.5%	23.6%	40.0%	21.8%
	GRADE 7	106	542.3	53.8%	24.5%	17.0%	4.7%
	GRADE 8	94	590.9	18.1%	18.1%	43.6%	20.2%
56	GRADE 6	19	561.5	0.0%	21.1%	57.9%	21.1%
	GRADE 7	21	560.4	33.3%	23.8%	14.3%	28.6%
	GRADE 8	25	628.8	0.0%	4.0%	40.0%	56.0%
57	GRADE 6	134	560.3	17.9%	11.2%	33.6%	37.3%
	GRADE 7	145	569.3	26.9%	14.5%	33.1%	25.5%
	GRADE 8	142	608.3	5.6%	12.0%	48.6%	33.8%

Personal interviews were conducted in an attempt to provide additional evidence. Teachers addressed interview questions based on trend data analysis of MCT scores from the years 2001-2004 (see Tables 1, 2, and 3).

Table 2
Proficiency Level Distribution 2002-2003

C A S E #	Percentage of Students Scoring Minimal, Basic, Proficient or Advanced in the Areas of Math on the Mississippi Curriculum Test (2002-2003)						
	SUBJECT	NUM	MEAN	<---PROFICIENCY LEVEL DISTRIBUTION--->			
	GRADE		SS	MINIMAL	BASIC	PROFICIENT	ADVANCED
	=====	=====	=====	=====	=====	=====	=====
19	MATHEMATICS						
	GRADE 6	134	554.9	17.9%	20.9%	33.6%	27.6%
	GRADE 7	157	563.8	29.9%	15.3%	38.9%	15.9%
44	GRADE 6	81	528.1	32.1%	32.1%	30.9%	4.9%
	GRADE 7	98	551.9	41.8%	22.4%	26.5%	9.2%
	GRADE 8	81	584.1	24.7%	24.7%	37.0%	13.6%
56	GRADE 6	19	561.4	15.8%	5.3%	57.9%	21.1%
	GRADE 7	24	590.3	12.5%	12.5%	37.5%	37.5%
	GRADE 8	22	565.8	40.9%	22.7%	31.8%	4.5%
57	GRADE 6	134	554.9	17.9%	20.9%	33.6%	27.6%
	GRADE 7	157	563.8	29.9%	15.3%	38.9%	15.9%
	GRADE 8	141	595.4	14.2%	23.4%	34.0%	28.4%

Table 3
Proficiency Level Distribution 2001-2002

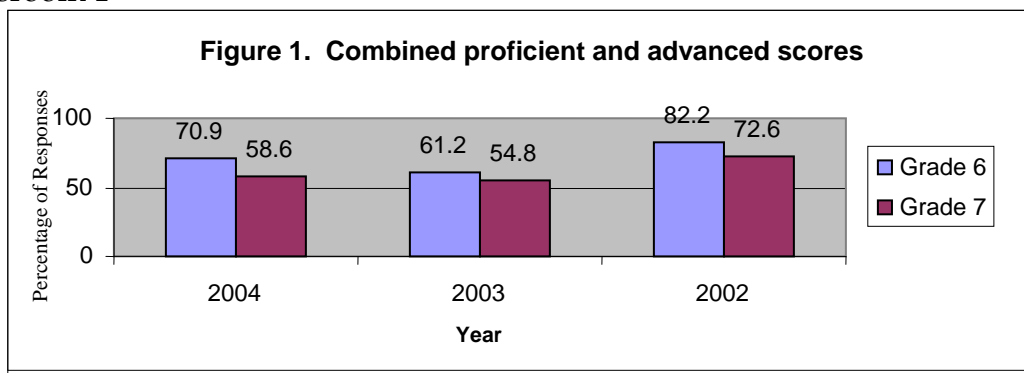
C A S E #	Percentage of Students Scoring Minimal, Basic, Proficient or Advanced in the Areas of Math on the Mississippi Curriculum Test (2001-2002)						
	SUBJECT	MEAN	<---PROFICIENCY LEVEL DISTRIBUTION-->				
	GRADE	NUM	SS	MINIMAL	BASIC	PROFICIENT	ADVANCED
	=====	=====	=====	=====	=====	=====	=====
19	MATHEMATICS						
	GRADE 6	175	570.1	10.9%	6.9%	29.1%	53.1%
44	GRADE 7	157	580.4	12.7%	14.6%	51.6%	21.0%
	GRADE 6	66	519.0	43.9%	24.2%	25.8%	6.1%
	GRADE 7	84	545.8	51.2%	25.0%	17.9%	6.0%
56	GRADE 8	95	563.4	46.3%	21.1%	24.2%	8.4%
	GRADE 6	27	553.2	14.8%	22.2%	33.3%	29.6%
	GRADE 7	24	543.4	58.3%	16.7%	20.8%	4.2%
	GRADE 8	21	577.0	28.6%	23.8%	42.9%	4.8%

Teachers were asked to look at the charts/figures relating to their school and provide answers to the following questions from the questionnaire:

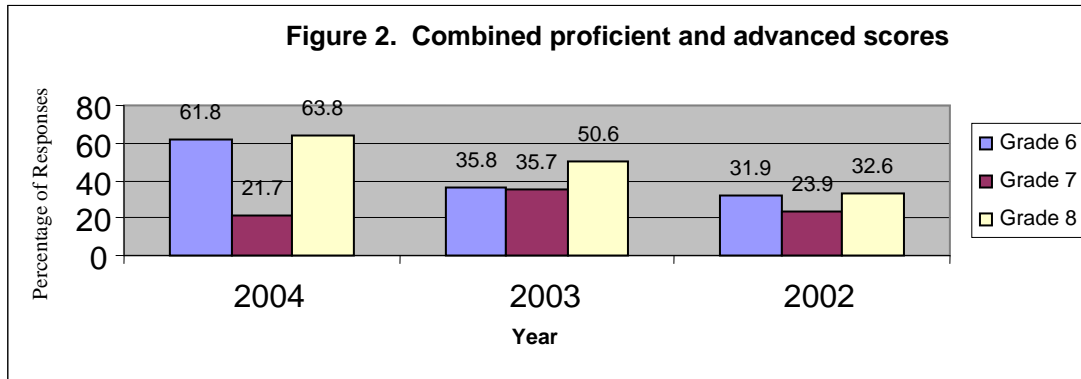
7. Were you teaching at this school during the 2001-2004 school years?
8. How were you addressing learning styles?
9. How do you explain the increase/decrease in test scores during these years?

Chart/figures depict combined proficient and advanced scores for the 2001-2004 school years for each school observed (see Figures 1, 2, 3 and 4).

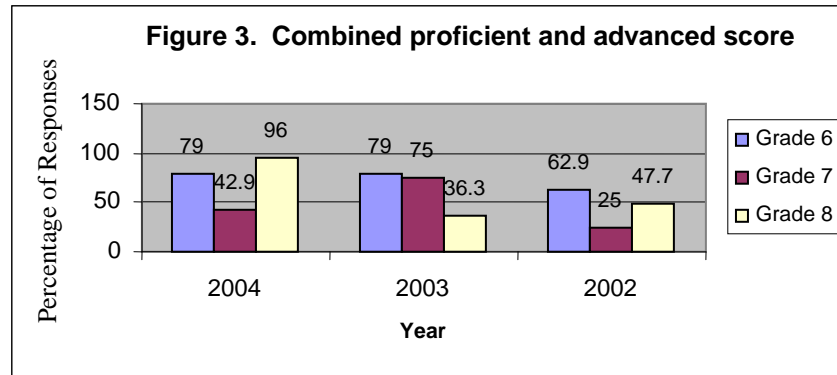
Classroom 1



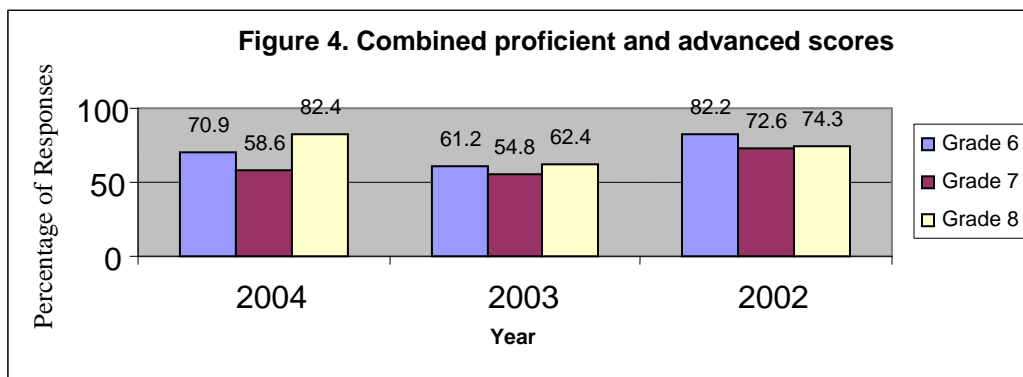
Classroom 2



Classroom 3



Classroom 4



School Improvement and Lesson Plans

School improvement plans were viewed in an attempt to evidence the appearance of the three essential components used to address learning styles. The plans served as evidence of the components that were to be implemented. Lesson plans were also viewed during classroom observations to determine if the three essential components used in addressing learning styles were included.

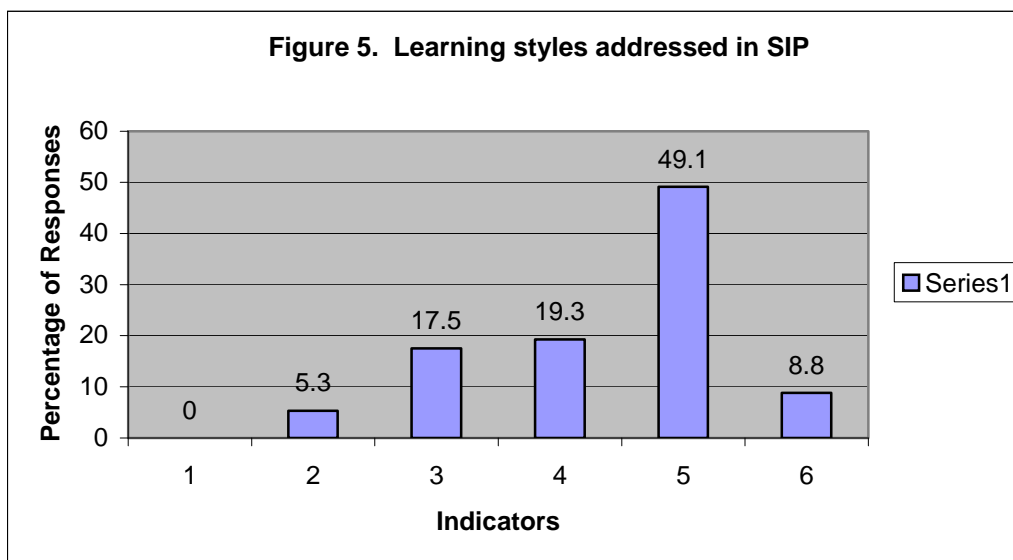
Findings

The findings included the responses from the 57 returned questionnaires, personal interviews, observations of the classrooms, school improvement plans and lesson plans only as they pertained to areas that were selected for analysis.

Question 1: On a scale from 0-5, with 5 indicating all components (visual, auditory, kinesthetic) addressed along with suggestions and 0 indicating that not any components were addressed, to what extent do you consider learning styles to be addressed in your School's Improvement Plan?

Results included 28 (49.1%) teachers checking 5, 11 (19.3%) checking 4, 10 (17.5%) checking 3, 3 (5.3%) teachers checking 2, and 0 (0.0%) checking 1. Five (8.8%) teachers did not respond to the question, indicated by the number 6 (see Figure 5).

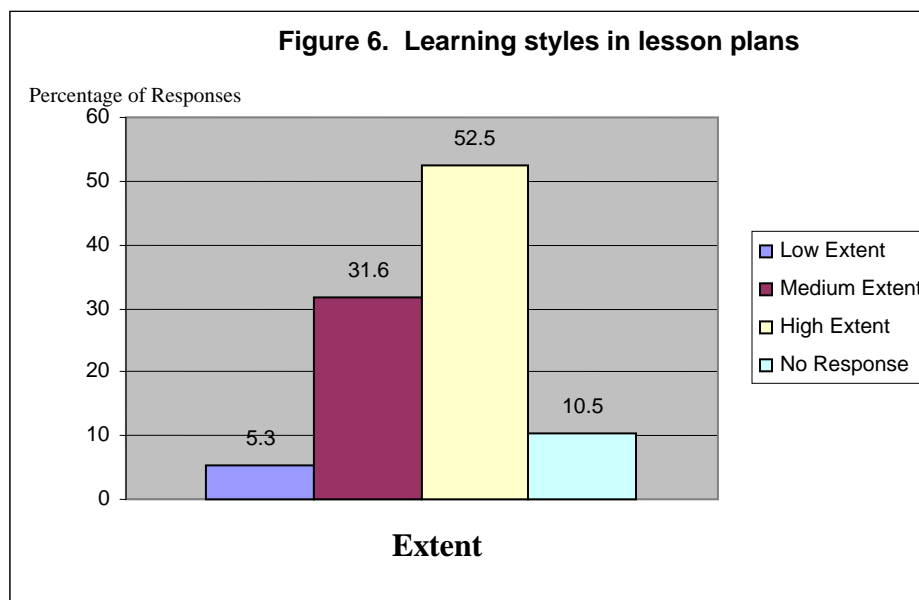
A review of school improvement plans showed that only 1 of 4 schools observed addressed the three components essential to addressing learning styles and provided suggestions as to implementation.



Question 2: To what extent are you addressing learning styles in your weekly mathematics lesson plans?

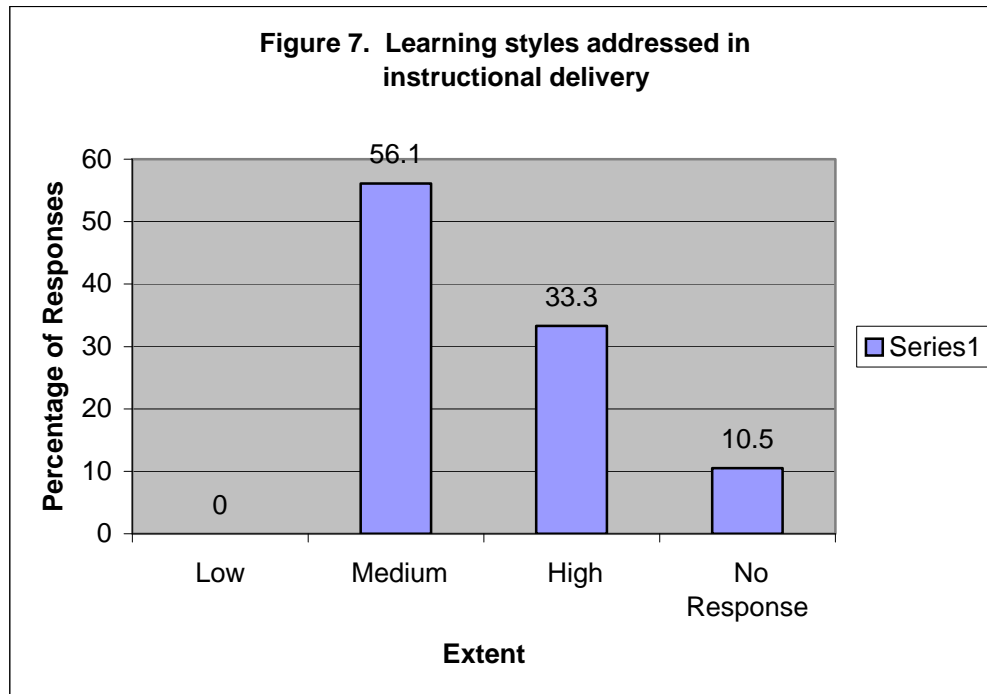
Thirty (52.5%) teachers were addressing learning styles to a high extent (addressing the three components), 18 (31.6%) teachers were addressing learning styles to a medium extent (addressing two components), and 3 (5.3%) teachers were addressing learning styles to a low extent (addressing only one component). Six (10.5%) teachers did not respond to the question (see Figure 6).

When lesson plans were examined, evidence was found that 3 of 3 plans addressed learning styles to a high extent. All plans included a target objective, procedures that were followed to accomplish the objective, teaching strategies that were used, and the learning style approaches that were addressed.



Question 3: To what extent are you addressing learning styles in your instructional delivery?

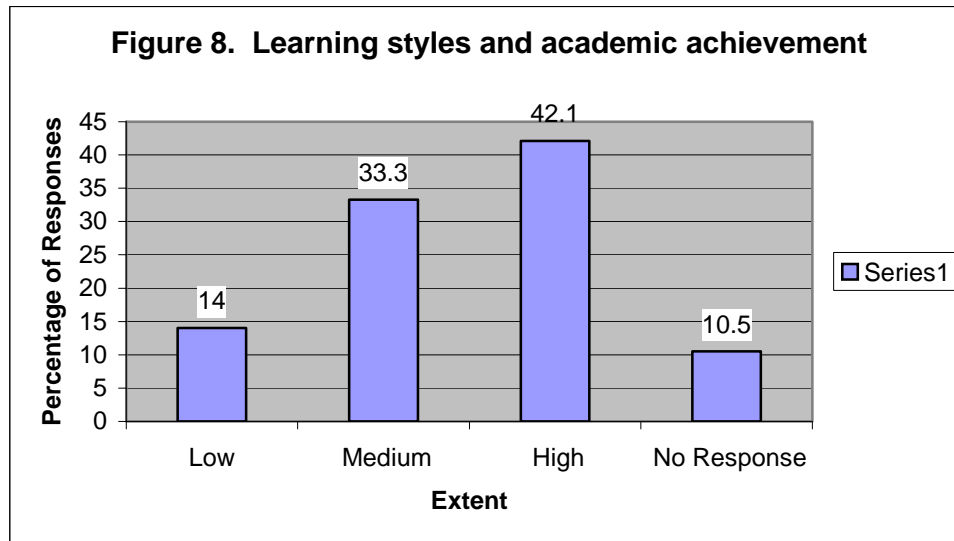
Nineteen (33.3%) teachers reported addressing learning styles at a high extent (addressing three components), 32 (56.1%) reported addressing learning styles to a medium extent (addressing only two components), 0 (0.0%) reported addressing learning styles to a low extent, while 6 (10.5%) did not respond to the question (see Figure 7).



When instructional delivery was observed, 4 of 4 teachers addressed all three components. The following is an example, when introducing radical expressions, the teacher first orally and visually explained the properties for simplifying radicals and rationalizing the denominator by providing examples and explaining the problem-solving techniques (**auditory/visual**). Students were then asked to copy notes from the board and discuss the examples provided by the teacher (**kinesthetic/auditory**). Students were given problems to solve where they received one-on-one instruction from the teacher and assistance from peer tutors (**kinesthetic/auditory/visual**).

Question 4: To what extent are you addressing the learning styles of students when assessing their academic achievement?

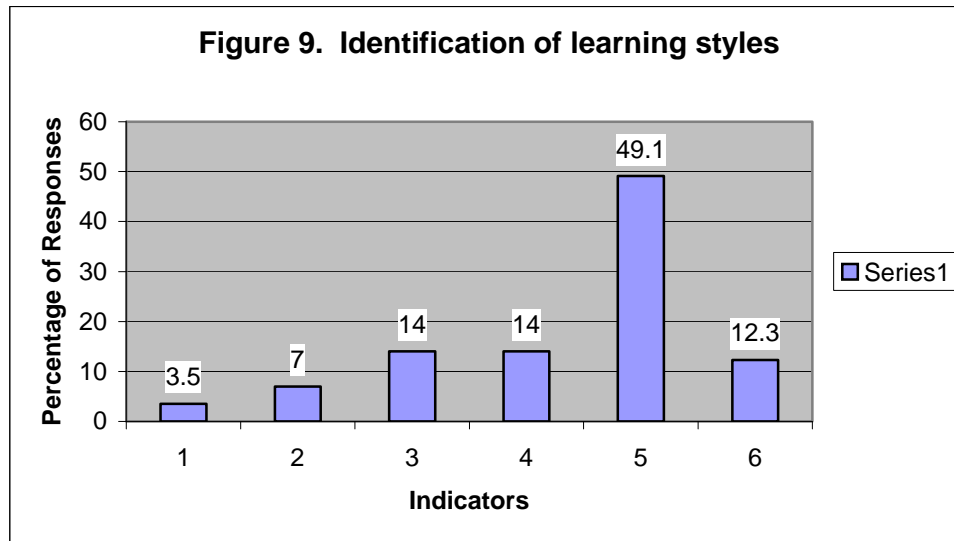
Twenty-four (42.1%) teachers reported that they addressed learning styles in accessing academic performance at a high extent (addressing three components), 19 (33.3%) addressed learning styles to a medium extent (addressing only two components), 8 (14.0%) addressed learning styles at a low percent (addressing only one component), and 6 (10.5%) did not address the question at all (see Figure 8).



During the classroom observations, 4 of 4 teachers provided weekly tests that were used to assess the mathematics achievement of students. For each test, teachers reported that oral along with written directions were provided to students. For students whose learning styles were of a kinesthetic nature, number boards, manipulatives, computers, and calculators were presented to them to complete the test. Teachers also reported that for some students that they have taught in the past, tape recorders were used, students responded to test questions orally instead of written, overhead projectors were used to draw pictures rather than use numbers and that rule charts were presented to students to assist them with the completion and passing of tests, classroom tasks and homework assignments.

Question 5: What method(s) do you use to identify the learning styles of students?

Twenty-eight (49.1%) reported that students' learning styles are identified through observations, 8 (14.0%) reported identifying learning styles through observations along with the use of a Learning Style Inventory, 8 (14.0%) reported identifying learning styles using student questionnaires and through observations, 4 (7.0%) reported using multiple methods (learning style inventories, student questionnaire, observation, other methods) to identify learning styles, 2 (3.5%) reported using a learning style inventory only to identify learning styles, and 7 (12.3%) teachers did not respond to the question (see Figure 9).



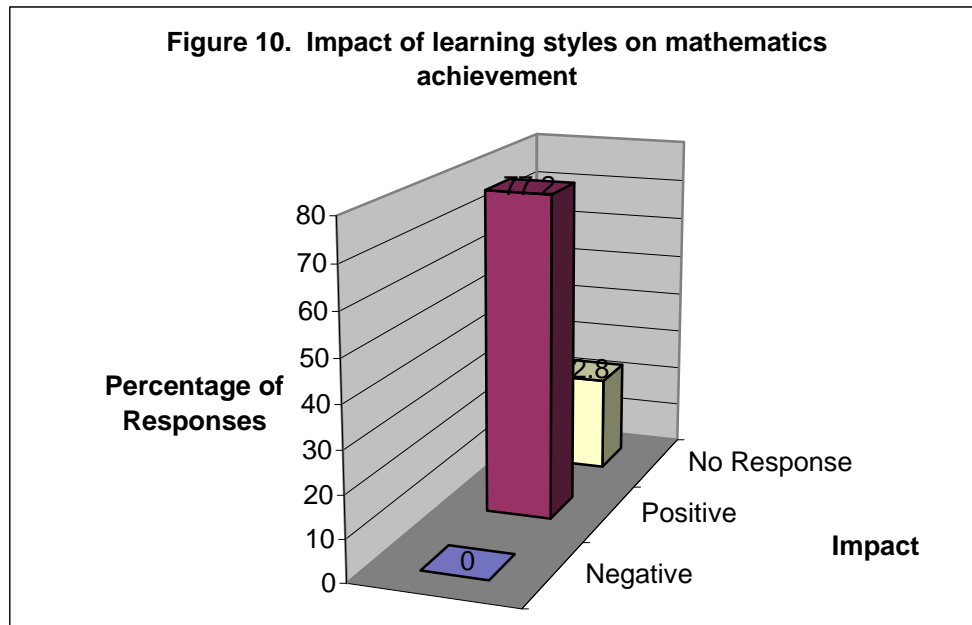
Question 6: In your opinion, when learning styles are addressed in your classroom, what impact, if any, does this have on student's mathematics performance? Briefly explain your response through testimonials, examples, etc.

Forty-four (77.2%) reported a positive rationale of the impact of addressing learning styles of mathematics performance, while 13 (22.8%) did not respond to the question. Testimonies and examples included "I have incorporated all the learning styles in my classroom. Learning styles such as visual, auditory, and kinesthetic are used daily in my lesson presentation. Experience has taught me that students retain more when they are allowed to become physically involved in the skill being taught. When a variety of learning styles are used in a lesson taught, students test scores are also better." "One student did not understand when lecturing, so I showed him hands-on. The student explored how to subtract integers by using counters." "A student's mathematics performance is greatly impacted when learning styles are addressed. My students need to see how a problem is solved along with an explanation of the steps. Also, students tend to remember longer when we have hands-on activities" (see Figure 10).

Interview questions revealed that 4 of 4 teachers were teaching at their various schools during the years 2001-2004 and that they all were addressing learning styles during those years. However, there were differences in opinions as to why MCT test scores were up and down during those years.

One teacher reported "the school has a great deal of low level students and that a small percentage of these students can bring down test scores. As long as students' score at the advanced and proficient level, scores basically remain the same, however, if a few scores drop to basic or minimal level, scores drop for the homeroom and bring down school scores."

Another teacher reported that there is a “difference in kids. Sometimes you have a better group of students as a whole. Kids will allow you to teach to a certain point, and then they shut down.” The teacher further stated “when students are taught specifically for the purpose of passing a test, it is harder for them to make adjustment to the next class level.”



Two teachers chose not to comment on the increase/decrease in scores.

Summary

When learning styles are addressed, does this practice serve to increase mathematics performance in the classroom and on high stakes tests? The literature suggests that when learning styles are addressed, students perform better academically. In addition, middle school mathematics teachers agree with the learning styles approach to enhance academic achievement.

Overall, a total of 89.5% of middle school mathematics teachers working in schools in the Mississippi Delta are addressing learning styles to some extent. Fifty-two percent of middle school mathematics teachers are addressing learning styles at a high extent, meaning that a visual, auditory and kinesthetic component, as defined by this evaluation, are being used in class to promote mathematics academic achievement. A review of selected lessons plans further evidenced this technique. Lesson plans contained components such as: use of newspaper ads to find the total cost of items; students being called on to solve problems from the board and explain the steps;

instructions being provided verbally as well as written; question and answer sessions; use of computers along with calculators to assist in solving problems; students completing projects; and having the opportunity to express themselves verbally rather than only in writing.

Though 49.1% of teachers indicated that learning styles were addressed in their school improvement plan, a review of a selected group of school improvement plans found that only 1 of 4 plans included learning style components along with suggestions as to how they would be implemented. The remaining selected group of teachers may have been among those 8.8% of teachers who did not respond to the question.

Teachers (33.3%) also reported addressing learning styles in their instructional delivery. From a classroom observation conducted on a selected group of middle school mathematics teachers, the evaluator was seeking to find teachers using visual (pictures, diagrams, slides), auditory (verbal instructions, dialogs, tape recorders), and kinesthetic (small group, concrete objects, exhibits) components in instructional delivery. The observation revealed that 3/3 teachers were addressing all components in their delivery. In one class, the class objective was to simplify complex numbers. The teacher, who already had problems on the board, used the visual and auditory component to show students how the problems should be solve by demonstrating steps and talking them through for the students. He then asked students to come to the board and follow the same procedures whiles instituting the kinesthetic components by allowing students at their desk to solve the problems using their calculators.

When assessing students' academic achievement in math, 42.1% of teachers reported addressing learning styles to a high extent indicating that all the essential components were used. During classroom observations conducted on a selected group, all teachers reported the use of verbal and written directions, allowing students to use calculators, question and answer sessions for clarification, and the use of an overhead projector. A review of one teacher-made test showed directions written in words and symbols, items where students drew the correct answer, test items written in bold type, and words of encouragement written in somewhat of a three dimensional format.

Identifying learning styles of students appeared to be a simple process for middle schools mathematics teachers. Observations were the primary source of identification as reported by 49.1% of the teachers. Other methods of identification included learning style inventories and student questionnaires.

Middle school mathematics teachers seem to think that when learning styles are addressed, there is a positive impact on mathematics performance. Teachers (77.2%) reported positive rationales as they pertain to the impact of learning styles on academic achievement. Teachers reported on the visual aspect of addressing learning styles, the auditory aspect, kinesthetic involvement, experiences addressing learning styles, and

how addressing learning styles in a variety of ways, during one lesson, enhances academic achievement.

State test results were reviewed for this selected group and indicated that 2 out of the 4 schools' combined proficient and advanced scores were above 50% for the school years 2001-2004. Scores for classroom 2 were above 50% for grades 6 and 8 in the 2004 school year. Scores fluctuated over the years for grade 7 with the highest combined score reported at 35.7% for the 2003 school year. Scores for classroom 3 were above 50% for grade 6 for all years and fluctuated over the years for grade 7 with the highest combined score reported in the 2002-2003 school year at 75%. Scores also fluctuated for grade 8 with the highest combined score reported in the 2003-2004 school year at 96%.

In conclusion, it appears that addressing learning styles may have some impact on high stakes testing and classroom academic achievement as evidenced from middle school mathematics teachers in the Mississippi Delta area through surveys, oral reports, classroom observations, review of lesson plans, school improvement plans and state test. All teachers appear to be addressing learning styles to some extent and have reported that the approaches being used are working to increase academic achievement. Learning styles are being addressed in lesson plans, instructional delivery and assessment. Teachers are making a special effort to identify learning styles for students and implement the corresponding activities to enhance learning. Teachers are also being trained by the state to address learning styles and maintain a positive rationale for doing so. This suggests that teachers are receiving more information on addressing learning styles and believe that it is important that they continue do so in attempting to increase academic performance in students.

References

- Borg, W. R., & Gall, M. D. (1983). *Educational research: An introduction*. New York: Longman.
- Dunn, R., & Dunn, K. (1978). *Teaching students through their individual learning styles: A practical approach*. Reston, VA: Reston.
- Eggen, P., & Kauchak, D. (2004). *Educational psychology: Windows on classrooms* (6th ed.). Upper Saddle River, NJ: Merrill Prentice Hall.
- Griggs, S. A. (1991). *Learning styles counseling*. Ann Arbor, MI: ERIC Clearinghouse on Counseling and Personnel Services.
- Kolb, D. A. (1984). *Experiential learning: Experience as the source of learning and development*. Englewood Cliffs, NJ: Prentice-Hall.

- Mind Tools. (2000). *How your learning styles affects your use of mnemonics*. Retrieved February 1, 2003, from <http://www.mindtoolsltd.com>.
- Reiff, J. C. (1992). *Learning styles*. Washington, DC: National Education Association.
- Schroeder, C. C. (1996). *New students-New learning styles*. Retrieved February 1, 2003, from <http://www.virtualschool.edu/mon/Academia/KierseyLearningStyles.html>.
- Shuell, T. (1996). Teaching and learning in a classroom context. In D. Berliner & R. Calfee (Eds.), *Handbook of educational psychology* (pp. 726-764). New York: Simon & Schuster.
- Snowman, J., & Biehler, R. (2003). *Psychology applied to teaching* (10th ed.). Boston, MA: Houghton Mifflin.
- Snow, R., Corno, L., & Jackson, D., III. (1996). Individual differences in affective and cognitive functions. In D. Berliner & R. Calfee (Eds.), *Handbook of educational psychology* (pp. 243-310). New York: Simon & Schuster Macmillan.
- Sternberg, R. (1998). Applying the triarchic theory of human intelligence in the classroom. In R. Sternberg & W. Williams (Eds.), *Intelligence, instruction, and assessment* (pp. 1-16). Mahway, NJ: Erlbaum.

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