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## Using writing to enhance critical thinking skills in the middle level classroom

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### Abstract

The Carnegie Council on Adolescent Development suggests that middle schools can vastly improve their curriculum by teaching adolescents to think critically (Carnegie, 1989). One way to teach students to think critically is to let them explore their own thoughts through the writing process. Kurfiss (1985) states that a student's ability to think critically is most likely to develop when prior knowledge and thinking skills are intertwined. For more than a decade, educators have utilized writing as a tool to help students learn in the classroom. Maimon (1982) suggests that writing should be an integral part of the learning process in all courses; for as children learn language, they learn to think. Some educators feel that "writing is a tool that enables people in every discipline to wrestle with facts and ideas" (Zinsser, 1988, p. 49). Research has shown a relationship between writing and critical thinking. The purpose of this study is to provide an operational definition of critical thinking and to suggest ways writing can promote critical thinking in the classroom.

USING WRITING TO ENHANCE CRITICAL THINKING  
SKILLS IN THE MIDDLE LEVEL CLASSROOM

A Graduate Project  
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## Using Writing to Enhance Critical Thinking

### Skills in the Middle Level Classroom

The Carnegie Council on Adolescent Development suggests that middle schools can vastly improve their curriculum by teaching adolescents to think critically (Carnegie, 1989). One way to teach students to think critically is to let them explore their own thoughts through the writing process. Kurfiss (1985) states that a student's ability to think critically is most likely to develop when prior knowledge and thinking skills are intertwined. For more than a decade, educators have utilized writing as a tool to help students learn in the classroom. Maimon (1982) suggests that writing should be an integral part of the learning process in all courses; for as children learn language, they learn to think. Some educators feel that "writing is a tool that enables people in every discipline to wrestle with facts and ideas" (Zinsser, 1988, p. 49). Research has shown a relationship between writing and critical thinking. The purpose of this study is to provide an operational definition of critical thinking and to suggest ways writing can promote critical thinking in the classroom.

## Critical Thinking

Critical thinking involves making sense of one's world by carefully examining issues to clarify and improve understanding. A critical thinker is open-minded and willing to look at a situation from another's point of view (Johnson and Johnson, 1988). Chaffee (1992) defines critical thinking as it refers to the following cognitive processes: solving problems and making informed decisions; generating, organizing, and evaluating ideas; reasoning analytically with concepts and abstract properties; exploring issues from multiple perspectives; and applying knowledge to various contexts and new circumstances. Critical thinkers also evaluate the logic and validity of information, develop evidence and arguments to support views, analyze situations while asking appropriate questions, discuss subjects in an organized way, and are aware of their own thinking process in order to monitor and direct it.

Identifying and challenging assumptions that underlie ideas is central to critical thinking (Brookfield, 1988). Meyers (1986) asserts that challenging assumptions can be highly emotional and

discomforting. When people look at cherished values and personal beliefs, they are challenging their self-concept. Therefore, teaching critical thinking "involves intentionally creating an atmosphere of disequilibrium, so students can change, rework, or reconstruct their thinking processes" (p. 14).

Critical thinking involves not only providing students with the skills needed to analyze, compare and contrast, and differentiate between fact and opinion, but also creates an awareness that people are products of choices made in life. According to Paul (1984), critical thinking is central to a free society, and students must learn to examine issues from all sides before making informed decisions. Critical thinking skills will be required to solve global problems such as world hunger, the development of Third World nations, and a clean environment. The skills of critical thinking enable middle school students to make educated choices which will determine their future.

One way for students to practice making informed decisions is through the use of structured controversy (Johnson & Johnson, 1988). This exercise in cooperative learning enables students to strengthen their own

perspective as they justify their opinion to peers. At the same time, students gain an understanding of alternative points of view. As students advocate a position, critically evaluate information, reason inductively and deductively, synthesize information and form conclusions, they are practicing critical thinking skills.

### The Value of Writing

If language and thinking interact, then different kinds of language used in different situations make possible different kinds of thinking. Parker and Goodkin (1987) have researched the relationship of language to thinking and have determined that there are four modes of learning, each requiring a different type of language skill. Imaginative learning is enhanced by the use of mime, novels, and plays, while formal learning requires speeches, essays, and reports. Analytic thought is enhanced by journal entries, classroom discussions, and progress reports while informal thinking appears in improvisations, and stories as well as journals. In schools, imaginative and informal thinking are often ignored while formal and analytic thought is stressed. All four types of



thinking, however, are intertwined in normal living and development. Parker and Goodkin recommend that reading, writing, and thinking should be incorporated into all curricular areas.

Herrington (1981) points out that writing is linked to course objectives, and writing opportunities are used to observe and make generalizations about content or in problem-solving exercises. Herrington also notes that students who used writing in content areas indicated that writing was a powerful learning tool for them. In fact, 90 percent of the students reported that writing about content added at least in some degree to the understanding of course material.

Maimon's study of writing at Beaver College documents the value of writing as a learning tool (cited in Smith, 1983). Maimon identifies four ways writing aids learning. First writing, like learning, is a process. Second, writing is a way to learn, not merely a means of communicating to others what has already been mastered. Next, writing and learning are interactive processes. Students must practice both in cooperative learning experiences. Finally, writing in a discipline defines and manifests fundamental

processes within that discipline. Drafts are written and rewritten not just to correct errors through proofreading, but to formulate ideas.

Arkle (1985) agrees that writing helps students understand content better by forming personal connections to what students are reading. Arkle recommends that students write questions about what they are reading and relate content to their own experiences. In addition, writing helps students deal with feelings about math or history lessons and helps students explain problems to themselves. Do they agree or disagree with the author? How does what they are reading relate to other content areas? How does the content relate to the student's own experience?

Moreover, Walshe (1987) writes that writing collects and stores ideas as well as clarifies thinking. Writing unlocks the creativity of the mind as students learn to write as well as write to learn. Writing comes from ideas generated through reading, research, note-taking, talking things over, and "on insights that come with waiting and incubating thought" (p.26). Walshe promotes collaborative learning in which everyone in the classroom is able to write, read,

talk, and think. Students work individually, with partners, in a small group, or occasionally with the whole class. There is student to student as well as student to teacher interaction.

In a study of small groups of students using writing-to-learn in their classrooms, Stevens (1985) reported the value of writing as a learning aid. Several groups spoke of its power as a memory aid or facilitator of thought. For many students, writing was a way to become personally involved with characters in stories they were reading. Student comments included: "Writing helps you learn because of the questioning process during the writing process." "You have all these ideas in your head," commented one student, "but you're not aware of them until you write them down." "If you can write it, you can understand it," said another student (p.215). Stevens recommends that teachers who wish to incorporate more writing into their instructional repertoire should do so in an active classroom where students learn from each other as well as the course material.

In the same way, Pearse (1985) records that writing-to-learn strategies in his classroom help

students in many ways. First, the role of teacher changes from dispenser of information to class coordinator and contributor, enabling students to be more responsible for their own learning. This creates an environment where students express their feelings about and reactions to their learning. Writing also provides the instructor with on-going checks of student understanding and application of course concepts and material. Finally, writing serves as a springboard for activities and projects which demonstrate the extent and quality of student learning and involves students actively with class work.

Writing to learn demands active involvement on the part of the learner. Learners engage material on the basis of previous experience and make it their own (Mayher & Lester, 1983). "Knowledge is always a personal possession, and it is always based on the knower's personal experience" (p. 721). One effective way to record personal experiences and relate them to textbook learning is through the use of journals.

#### Journals As a Learning Tool

Fulwiler has written extensively about the use of journals as a learning tool. Journals work to keep

students actively and personally involved in the curriculum as they build reading, thinking and writing skills. Fulwiler (1980) writes that journals enhance learning by invigorating class discussion, starting small group activity, clarifying thinking, stimulating imaginations, and reinforcing learning. Journal writing not only individualizes instruction, but helps students get personally involved in the learning process. Ideas are generated while observations and emotions can be shared. Students write in their journals for five minutes at the beginning of class to focus on the topic of the day. Journals are also used at the end of class to summarize and personalize learning as students relate course content to their personal experience or to content from other courses.

For example, entries in a history journal may help students make connections with personalities they are studying. How is this individual like me? What motivated his/her actions? Would I have acted the same way? How would this person have reacted today? Similarly, science teachers have students record thoughts about experiments as well as observations of what happens. Social Studies teachers have students

record feelings about current events. How does the breakup of the Soviet Union affect me? How does it affect the world? By writing regularly in journals, students realize they must think about what they read, see, hear, and learn to recognize what information is significant. Students make value judgments as they try to make sense out of the real world (Hols, 1990).

Journals promote critical thought by helping students relate what they are studying in one class to content in another. For example, how does what a student learns about the Civil War in social studies relate to knowledge of a literary character in Sounder? Journal writing also promotes problem solving by listing possible solutions to problems, pros and cons of arguments, and posing "What would happen if...?" questions for students. Students stretch their imaginations as they answer questions in their journals.

Teachers write in their own journals daily as models for the class. Teachers do not grade journals, but collect them periodically, read the entries, and make encouraging comments or ask questions that prompt students to write more (Jenkinson, 1988). If students

write something personal they do not want the teacher to read, they are encouraged to fold that journal page in two, feeling confident that the teacher will not read the entry. Students may remove highly personal pages before handing in their journals.

Juell (1985) lists the following benefits of journal writing: journals encourage students to become independent thinkers directly involved in and aware of their learning. Journals encourage students to be creative thinkers who develop new connections rather than memorize facts. Journal writing is used as a process for discovery and clarification of ideas. Finally, journal writing encourages students to learn that writing is thinking.

#### Writing-to-Learn Activities in Content Disciplines

Although journal writing is an effective means of incorporating writing and thinking into the curriculum, other techniques work as well. Questions may be written at the beginning of class to stimulate class discussion. Requiring written answers to questions after viewing a film keeps students actively involved. A report written after a field trip summarizes learning and makes connections with previous learning. Similar

to journals, learning logs are a place where students write questions about new learning, predict outcomes, solve problems and reach conclusions (Steinbrink & Kelly, 1988). As students write in their learning log or journal, they have the opportunity to assess their own learning, discover areas where knowledge is incomplete and identify what concepts are known. By reading the student journals, teachers know what concepts students understand and where additional explanation is needed. Writing is used in social studies, science, math and language arts classes to personalize learning and help students form links between what they are learning and what they already know.

### Social Studies

In social studies, for example, an assignment to write a letter to a friend or family member from an historical character's point of view makes use of application, a critical thinking skill. Another time, students are asked to describe how they would build a log house, or write a diary entry from a Pilgrim girl's point of view telling how her family survived the first winter in America. This technique, known as Invented



Dialogue (Cross and Angelo, 1988) requires students to synthesize knowledge of issues, personalities, and historical periods of time. Students may invent dialogue which fits the character and context of the situation. Invented Dialogues provide rich information on student understanding of theories, controversies, and opinions of others. This technique challenges students to creatively present material they have studied (p.78).

Writing provides a way for students to discover links between what they are studying and previous experiences (Steinbrink and Kelly, 1988). A middle school boy who has had to share a bedroom with a younger brother or share a locker with a stranger has a better understanding of territorial disputes in the Middle East. Following the bombing of Libya, eighth graders were asked to write responses to the following question: What is the next step for the United States? Opinions were expressed which might never have emerged in class discussion. Comments such as, "I think the U.S. should bomb Libya off the map!" were balanced with, "We must avoid war and spend more time talking with Gadhafi" (p.122).

During the Desert Storm conflict, middle school students had an opportunity to view first-hand accounts of war. Extensive television coverage of battles and bombings allowed students to experience the sights and sounds of war. In addition, many students had a personal involvement in the war because they had a brother, father, cousin, friend, or neighbor in Saudi Arabia. One sixth grade boy recorded in his journal:

The best memory I had this year was when I heard on CNN that the war had ended. I was so glad because I knew the troops would be coming home soon, and that there would be no more killing and shooting. I'm really glad it's over.

Seeking to incorporate writing into the social studies curriculum, teachers ask students to write about their own past when they are studying figures from history. Students have a history too. These writings can be collected into a classroom book or added to a personal book for each student. The following entry was written by a sixth grade boy:

My favorite toy was my Winnie the Pooh Bear. I took Pooh everywhere I went. By the time I was three, his eyes and leg had already been sewn on

three times. When I was a little baby, I had to go for an operation. Pooh came along too. It seemed that if I didn't have my Pooh Bear with me, the whole world would fall apart. I know for sure that Pooh will stay in my memory box all my life.

Writings such as these allow students to see themselves as part of the past. Another writing activity in social studies is to have students conduct interviews with a parent, grandparent, friend, or community leader to gain a new perspective on a time in history. The following is part of a fifth grade boy's interview with his father:

My dad volunteered for the United States Air Force in 1965. This was midway through the Vietnam War. His rank was Airman Basic when he trained in the medical corp. When he was shipped to Vietnam, he was a Sergeant working as an air medic on a helicopter. I asked him, "Were you shot?" He said, "No, I was shot at but never hit." After flying forty missions into enemy held territory, picking up downed and wounded pilots, he was awarded the Air Medal. Dad was discharged after serving three years and seven months.

Another social studies activity enables students to experience being handicapped or prejudice. A student goes through a day at school in a wheelchair and then writes about feelings, limitations, what was hard or easy to do, and other people's reactions. In the same way, a teacher announces to his class that, "Today all blue-eyed people will go to the back of the lunch line and will not be allowed to play basketball during lunch break." After experiencing this act of discrimination, students write about their feelings. This exercise helps students realize what Blacks in the South may have felt before civil rights legislation was passed. Writing about feelings helps students analyze their life experiences and relate them to what others have experienced before them.

### Language Arts

The language arts curriculum is a natural for using writing to enhance critical thinking skills. When studying a novel, for example, students may be asked to write different endings to the story. Students become personally involved in the story when they are asked to write responses to questions such as: Do the character's actions and the progress of the

story make sense to you? Why or why not? Is everything in the story essential to the story's success? What could be deleted? How are the characters developed? Do they seem like real people to you? How are the main characters different from each other? Critical thinking skills of comparing and contrasting, evaluating, and relating what they are reading to their own experience are all practiced with these assignments.

Students need to know that authors write from their own perspective. Students think of three questions they would like to ask the author, or they tell the writer what he or she does best and encourage them to continue doing it. In another exercise, students suggest changing first to third person, past to present tense, or emphasis of a different theme. In this way, students learn that writers not only bring their own experience to writing, but also change the story by using different techniques.

When teaching poetry to students, critical thinking skills may be used as well. As the teacher slowly reads a poem, students write it on paper, putting break lines where they think lines will appear.

Students speculate why the poet chose to break lines where he did. Questions such as the following may be discussed: Does changing the form affect the poem? Students analyze the rhyme scheme and pick out figurative language such as similes and metaphors. When poems have been studied, students write their own poems. In this way, the critical thinking skill of transferring ideas to new situations is practiced.

Publishing a classroom newspaper is a good cooperative learning activity. Students are assigned roles of reporter, editor, illustrator, advertising agent, or publisher. Students work together in groups to collect, write, and edit news stories. Evaluation of the activity includes how well everyone works together and if each student contributes to the finished product. Critical thinking skills of making value judgments, raising pertinent questions, and exploring other's beliefs and values are taught through a classroom newspaper activity.

#### Using Writing in Mathematics Instruction

In the same way, writing encourages students to organize, analyze, synthesize and reflect on thoughts in the mathematics curriculum (Vukovich, 1985). Asking

students to write steps used to solve a problem forces them to think critically about the problem-solving process. In addition, writing allows students to compare their reasoning processes with those of other students.

Haggerty and Wolf (1991) offer several ways to incorporate writing into the middle school mathematics curriculum. Students may write about the life of some noted mathematician, or they may write original word problems based on the topic being studied. Frequently, teachers ask students to explain a mathematical process such as multiplication or division with a remainder. Students also draft business letters which order merchandise from a catalogue, magazine, or newspaper. Using the information given, students add the cost of merchandise ordered as well as gain the experience of writing a business letter.

In a recent study using writing to help elementary students learn math (Evans, 1984), two groups of fifth grade students were taught units on multiplication and geometry. One group used writing to help them learn math while the control group used no writing. The experimental group used three types of writing in their

units. First, explanations were written which described how to do something. One girl explained the process of multiplication while another described how to draw a 60 degree angle. Second, the group wrote definitions. Examples of written definitions are: "A ray is a line that goes forever from one side of its endpoint." "A line and a plane both go straight forever. They are different because a plane goes sideways too" (p. 831). By reading student definitions, the teacher gains knowledge of which students understand concepts and where reteaching is necessary.

In the final type of writing, students explained errors on homework or quizzes before turning in their papers. Examples of student comments were: "I missed this problem because I put forty-two down on seven times seven instead of forty-nine" (p. 833). Writing also serves as a positive reinforcer for students who do well, as the following comment indicates: "I did a wonderful job on this test!" (p. 834).

Results of the study showed that even though the experimental group had lower pretest scores, they did equally well or better than the control group on the



posttest. In the unit on multiplication, the experimental group scored 41% on the pretest while the control group scored 54%. At the end of the unit, the experimental group scored 77% while the control group scored 76%. Similarly, on the geometry unit, the experimental group's pretest score was 17% compared to 23.5% for the control group. Posttest scores were 70% for the experimental group and 60.3% for the control group. Looking at individual scores, Evans concluded that students with the lowest pretest scores made the most gains. She found that writing not only helps students learn more math, but also provides a great assist for those who need it the most (p. 835).

#### Using Writing in Science Instruction

Middle level students need to be involved in active learning that integrates knowledge from one subject area with that of another. Jarvis (1987) feels that every student possesses a body of knowledge accumulated through past learning experiences. When past experience is inadequate, it is supplemented with activities in the classroom. The science curriculum offers opportunities for students to use writing to facilitate learning as results of experiments are

recorded, reports are written, and connections with other curricular areas are made.

One sixth grader wrote the following report after completing an experiment on liquids and gases:

The experiment's purpose was to show when you heat water molecules, they speed up and can move molecules of food coloring much faster. First, I filled one glass with warm water and one glass with cold water. Then I put green food coloring in the warm water and yellow food coloring in the cold water. Next I let the glasses sit on the table for four minutes without moving them. The green food coloring spread quickly, but it took a while to get to the bottom. The yellow food coloring went directly to the bottom and then spread out. By the end of four minutes, the green food coloring was almost all spread out, while the yellow food coloring was still mostly on the bottom of the glass. Warmer liquids don't hold as much dissolved gas as cold liquids, so the warmer water wouldn't have as many gas molecules taking up space, and the food coloring molecules moved through the water more freely. As the temperature

of the water gets warmer, molecules of water move faster and farther apart, letting gas bubbles escape. Thus, the food coloring (green) moved through the warm water faster.

A unit often included in the middle level science curriculum is simple machines. In this unit, students practice predicting skills by posing questions such as: How much force do you predict it will take to hold this cart on the incline? How will the force change if we make the ramp steeper? Students predict results with the ramp at various angles; experiments are set up, and data is recorded. Tables are made of the results. Were predictions accurate? Summaries are written of what was done and what was learned about ramps and force. (Paul, Binker, Martin, Vetrano, & Kreklau, 1989).

Thomas (1991) has developed an interdisciplinary learning center where students compare and contrast rocks and minerals. Students note color, hardness and composition of minerals as observation and classification skills are used. Investigative reports are written about people who used rocks for tools, or famous rock formations such as Stonehenge or Mt.

Rushmore. Math skills of weighing and measuring, estimating, and seriating involve critical thinking skills of investigating, inferring, and concluding. Language arts skills are enhanced as students write reports on the origin of sayings such as "Sticks and stones may break my bones," "Rolling stones gather no moss," and "hard-rock music" (p.12). Vocabulary grows as students learn terms such as opaque, translucent, igneous, sedimentary, and metamorphic. This learning center not only actively involves students in their own learning, but enables teachers to integrate concepts from more than one discipline.

#### Implications for Teachers

Advocates of writing-across-the-curriculum frequently state that writing is a way of learning. Gray (1988) believes that writing is a means of instruction in almost every subject because students learn how to think as they read and write. Kurfiss (1985) believes that writing helps students learn and think about content in any discipline. She advocates the use of short essays on topics being studied to help students formulate ideas. The use of peer editing helps students see topics from another's point of view.

Short essays help students make sense of the course content as well as stimulate class discussion. Writing also helps students connect knowledge with personal experience and what has previously been learned.

In middle level classrooms, students write regularly and receive feedback from their teacher as well as other students. Teachers model writing and share their work with students. Teachers make students feel good about their writing by giving stickers, stamps, and comments on papers (Haggerty & Wolf, 1991). These positive reinforcers make students feel good about themselves as well as their writing.

Writing is a way to increase student involvement in the classroom. Shaughnessy (1977) would like to see writing become "a more integral part of the learning process in all courses" (p. 87). In order for students to learn new material, they must think about concepts and relate them to previous knowledge. Van Allen (1980) states, "The mere process of writing is one of the most powerful tools we have for clarifying our own thinking" (p. 2). Writing motivates students, focuses on the task at hand, reviews material, and reformulates or extends knowledge. Sharing writing with others

helps students discover multiple perspectives on issues. Writing is one of the best ways for middle level educators to make learning personal and keep students actively involved in the learning process. Critical thinking skills are enhanced through writing as well, as students examine beliefs, evaluate information, tie new knowledge to previous experience, and form conclusions.

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