

Running Head: IMPLICATIONS OF INTERACTIVE NOTEBOOKS

Putting it all Together; Understanding the Research Behind Interactive Notebooks

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Abstract

The purpose of this study was to examine the literature that supports the use of interactive notebooks as an effective learning tool. Interactive notebooks are used widely throughout classrooms so it is important for educators to understand the theories that support their use. Educators should also understand how to create and set up an interactive notebook in their classroom. They should also be cognizant of the advantages and disadvantages of the notebooks.

The literature on brain research, multiple intelligences, and note taking all support the classroom use of interactive notebooks. By understanding the research teachers can more effectively implement a strategy to enhance student achievement. One shortcoming revealed in the literature review was the lack of research directly applied to interactive notebooks. Parallels were therefore drawn between other research and the potential application of interactive notebooks.

Findings support the use of interactive notebooks in the classroom when appropriate. Teachers must decide when interactive notebooks will enhance student learning and lead to increased student achievement.

Table of Contents

Chapter 1	4
Introduction.....	5
Focus of the Project.....	5
Brief Review of Relevant Literature.....	5
Procedures.....	7
Description and Application of Study's Contribution.....	8
Definition of Terms.....	8
Limitations of the Study.....	10
Chapter 2.....	11
How to set up an interactive notebook.....	12
Chapter 3.....	17
Research on the Brain and learning.....	18
Multiple Intelligences.....	24
Note-taking strategies.....	30
Teachers' Curriculum Institute.....	35
Summary of findings.....	37
Chapter 4.....	39
Advantages of interactive notebooks.....	40
Disadvantages of interactive notebooks.....	41
Chapter 5.....	44
Summary of Findings.....	45
Conclusion.....	48
Recommendations and Implications for the Practitioner.....	48
References.....	50
Appendix.....	57

Chapter 1

Introduction

Introduction

Interactive notebooks are widely used in the classroom; some school systems have made them mandatory for particular subjects while in other systems, teachers use them independently. The purpose behind an interactive notebook is to help students organize and synthesize information given to them in class. The reasoning behind interactive notebooks originated with instructional strategies such as note taking, concept mapping, and organization of information as well as brain research about how students learn best. Interactive notebooks combine all of this research into one instructional method to promote student learning.

Focus of the Project

As interactive notebooks grow in popularity, it is important to understand the research that supports their use. Although research exists that supports the thinking and theory behind interactive notebooks, it has not been compiled. Therefore, a need exists for that research to be collected and synthesized to provide support and evidence for the use of interactive notebooks as an effective learning tool. In addition, interactive notebooks need to be explained so all students, parents, teachers, and administrators understand their application and organization.

Brief Review of Relevant Literature

A significant amount of research has been done in the areas of learning styles, multiple intelligences and strategies for note taking. However, to date there has been little research applied to interactive notebooks; this study will focus on the theories that support the use of interactive notebooks. When considering the use of interactive notebooks, teachers must be cognizant of the learning styles and intelligence strengths of each student and how to accommodate them.

Each classroom has a wide range of students with an equally wide range of interests and abilities. Because students have different learning styles, the teacher must accommodate “these various abilities, in order to properly plan and conduct assignments and assess what students have learned” (Manner, 2001). Interactive notebooks are one way for a teacher to accomplish that goal. These notebooks provide teachers with an organizational tool for their lessons, encouraging the use of different types of lessons, and can be helpful when planning for the learning styles of students.

According to Gardner (1993) there are eight different types of intelligences; linguistic, logical-mathematical, musical, spatial, bodily/kinesthetic, naturalistic, interpersonal and intrapersonal. Though students tend to be strong in some intelligence areas and weak in others, it is important for them to be exposed to all types of intelligences. Teachers can use the interactive notebook to plan lessons to reach a broad spectrum of intelligences. There is research on the brain that indicates the importance of note taking and teaching students according to their learning styles.

Though teachers do not necessarily need an in-depth knowledge of the brain, a basic knowledge of its functions can be helpful when planning lessons. The brain is divided into different sections each with a separate function. The cerebral part of the brain is divided in the right and left hemisphere. “The hemispheres are divided into the occipital lobe that processes visual information, the temporal lobe processing auditory information and some memory and the parietal lobe processing feeling and touch. The frontal lobe specializes in decision-making planning and problem solving” (Stickel, 2005).

As teachers plan, they should think about creating lessons that involve all of the lobes in the brain. Interactive notebooks are potentially an effective means to organize information to

accomplish this. According to Kiewra (1996) “the interactive notebook could be analogous to an information-processing model. This model involves the processes of selective attention, encoding (coding information into usable form), placement of information into short-term memory, storages in long-term memory, and retrieval from memory”.

The interactive notebook can be an important tool to help students remember and review information needed for assessments. The right side of the notebook can be used for notes provided by the teacher; this is the side that students use to study for assessment. Teachers that provide their students with notes were shown to have better achievement than those whose students personally recorded them (Kiewra, 1985b). If the students are given information to put on the notebook’s right side, they can use the left side of the notebook to put the information into their own words, drawings, etc. This helps the “brain by making connections between what is experienced (learned) and what that experience (information) means to the learner” (Caine, 2005).

Interactive notebooks can help students’ process information, study and review for assessments and personalize the content knowledge being presented. The same notebooks can help teachers plan lessons that reach a range of students’ abilities and learning styles. Overall, an interactive notebook is an organizational tool for teachers and students.

Procedures

A wide range of research was used to create a thorough and comprehensive study of interactive notebooks including educational journals and articles written by professionals in the field, scholarly books about instructional strategies, and brain research related to learning styles. Research conducted by Teacher’s Curriculum Institute (TCI), which promotes the use of

interactive notebooks in one of its commercially available programs was included as were online journals, articles and websites. After all of the research was compiled, it was synthesized and evaluated, allowing for a comprehensive overview of interactive notebooks as a teaching tool.

Description and Application of Study's Contribution

Student achievement is a major focus of schools. Teachers and administrators are always looking for ways to promote and increase student learning. This study on the research behind interactive notebooks reminds teachers of the value of learning styles, incorporating multiple intelligences in the lessons, and the brain research that supports how learning takes place. This study also provides a way for teachers to organize all of that information in their classroom through interactive notebooks. Currently, there are several different ways of organizing an interactive notebook. This study will use the available research to bring clarity to the topic. Teachers will be able to incorporate their current lessons and materials into an interactive notebook to increase student motivation and achievement.

Definition of Terms

Interactive notebook- a spiral notebook that is used to organize information. The right side is used for teacher information (notes, lectures, discussions, handouts, etc.) The left side is used for student information (drawings, cartoons, personalized wording of vocabulary, etc.) (Young, 2003).

Multiple intelligences- developed in the mid-1980s by Howard Gardner, professor of education at Harvard University. Gardner defines intelligence as the ability to solve problems or fashion products that are valued in at least one culture (Gardner, 2006). IQ tests, he points out,

cannot measure the value of a product or one's ability to produce a product. Within this context Gardner identified eight intelligences:

- linguistic
- logical-mathematical
- musical
- spatial
- bodily-kinesthetic
- interpersonal
- intrapersonal
- naturalist

and has postulated the existence of several others, including spiritual and existential. Everyone has these intelligences in different proportions. Teachers who use multiple intelligences theories strive to present subject matter in ways that use language, numbers, physical surroundings, sound, the body, and social skills (McBrien, n.d.).

Learning Styles- “This approach to learning emphasizes the fact that individuals perceive and process information in very different ways. The learning styles theory implies that how much individuals learn has more to do with whether the educational experience is geared toward their particular style of learning” (Funderstanding, n.d.).

Note-taking – The process of recording information presented by a teacher for the purpose of improving recall or understanding by the student. Notes typically include a combination of direct quotes of what a teacher says, diagrams, and additions by the student to add emphasis or to indicate areas where outside study may be required (Rowan, n.d.).

Limitations of the study

In researching the topic of interactive notebooks several limitations were encountered. First, there is very little research about the benefits or limitations of interactive notebooks. There

seems to be no research done that directly correlates student success to the use of interactive notebooks in the classroom versus a traditional binder. Secondly, much of the information being used to promote the use of interactive notebooks is merely captured through teacher anecdotes.

The teacher must be the one to use the variety of instructional methods and be aware of the different learning styles of the students. The interactive notebook is a way to organize the information being presented. The teacher has an important role in the effectiveness of the interactive notebook. Nevertheless, interactive notebooks are being widely used in classrooms and should be examined more closely.

Chapter 2

Interactive Notebook set up

An interactive notebook is used as an organizational tool for classroom instruction. Often interactive notebooks are spiral bound or large composition books. The notebooks have a hard or plastic cover to make them more durable. Generally, each student has a spiral notebook for his/her interactive notebook that he/she uses for recording information for the class; each pair of pages is designated for different purposes.

As students begin to set up their interactive notebook, its organization must be structured. Students should have the opportunity to decorate the front of their notebook to match the information that will be covered in the unit or to cover the notebook with pictures of items they are interested in. For example, when the class begins a science unit on plants, the students could cover their notebook with pictures of plants. Coincidentally, if students cover their notebooks with their own interests, the teacher will be able to see what they are interested in.

After the students have decorated the cover of their interactive notebook, the next page of each notebook should be a title page. On this page, students should have their name, the title of the unit, the teachers name, class period and some symbols or pictures that are related to the unit. Students should then create a table of contents where all information pertaining to the list of activities or notes and their page numbers are organized sequentially. The left side of the notebook will be even numbered while the right side will be odd numbered. Every page should be numbered and dated throughout the notebook. A table of contents should be glued in the front of the notebook for each unit. This way students can add and date their entries and number the consecutive pages throughout the notebook. All handouts should be kept in numerical order and glued so that they do not fall out.

Interactive notebooks allow students to record information and process it to improve their level of understanding. As students learn new ideas, they can use several types of writing and

graphic techniques to record them. Then students will do something with those ideas. In doing so students will use critical-thinking skills to organize and process information. As a result, students can become more creative, more independent thinkers, and they will develop a deeper understanding of the information being taught (Ayati, 2006). In interactive notebooks, key ideas can be underlined in color or highlighted. Venn diagrams can be used to show relationships. Cartoon sketches can show people and events or summarize main ideas. Indentations and bullets can allow students to rank information in order of importance. Arrows can show cause-and-effect relationships. By using such strategies, students will develop graphic thinking skills which will allow them to express ideas in the way they will best understand (Trucillo, 2006). “In the interactive notebook, students record information in an engaging way. They actually become involved with the material by making charts, illustrating their notes, creating time lines, writing poetry, and stating their opinion. Doing this helps all students to demonstrate what they have learned and to remember that material” (Trucillo, 2006).

According to Young (2003), interactive notebooks should be organized in the same manner with the right side being used for input (lectures, labs, etc.) while the left side is used for output (drawings, reflections, etc.). “The right side of the notebook is used to record notes on a mini-lesson, lecture, reading, class discussion, etc. The left side of the notebook is used solely for the purpose of the student’s individual interaction with the information on the right page. This interaction is not directed by the teacher in any way other than a list of possible options for the various methods from which a student may want to choose” (Ludewig, 2006). It is important for each student to have the same information on each page. While students should have the same information on the same page, it may be demonstrated in different ways. As a result, each student will create their own unique version of the information in an interactive notebook.

Interactive notebooks engage students in learning while teaching them valuable organizational skills. The interactive notebook is not just about keeping things organized but also about organizing the learning process.

The right side of the notebook is for the teacher and teacher directed learning. Students are provided with notes from readings and lectures, answers to fact based questions which make sure that the objective for content is met. Notes on mini-lessons, lectures, labs, readings, films/videos/documentaries, small group or large group discussion, collaborative group process or possibly a copy of an excerpt from a text can be provided. According to Young (2003), the right side of the interactive notebook uses both the right and left brain hemispheres to help the students remember important concepts.

The left side of the notebook is for student directed, subjective information. Students can express their interpretations and reactions to the content through original and creative ideas. First, interactive notebooks expose students to the lesson either by accessing prior knowledge or by an introduction activity, or “hooking” to the lesson. Any activities done to hook the students can be placed on the left side of the notebook. This could be a short video clip introducing the lesson, a pre-test, a KWL chart, or the vocabulary for the lesson.

Additionally, the interactive notebook will help students to process the information learned during left side activities. The left side is where the student travels beyond the instruction and really allows the lesson to penetrate. As students process the information which has been presented, they can review information in a number of ways. It is not always possible, but this section of the notebook tries to reflect the student’s creativity as well as understanding of the subject matter.

After the lesson has been presented, students can paraphrase or clarify items, enter a drawing, photo, sketch, or magazine picture that illustrates the concept, ideas, or facts, pose questions about the information, form and express an opinion, predict outcomes or next steps, create a metaphor that captures the essence of the information/issue and formulate and record a contradictory perspective (Ludewig, 2006). In addition, students can write a reflection on the information or experience. They can find a quote that connects to the concept, record it and explain their rationale, make connections between the information/text and their own life, another text, and/or the world. Creating a mind map that captures the main topic and key concepts and supportive detail, acronyms about content. Students can review for assessment on the left side of the notebook as well. This gives students the opportunity to personalize information and connect it to other information that they already know.

The interactive notebook tries to meet the needs of the students on both sides of the notebook. The left side is for student to demonstrate learning while the right side is for the teacher to provide content knowledge. Here is an example of what type of information could be demonstrated through the content on each side of the interactive notebook. For an example of a completed page of an interactive notebook, see Appendix A.

Figure 1.

Left Side		Right Side
• Brainstorming	Mind maps	• Worksheets
• Concept maps	Venn diagrams	• Vocabulary words
• Pictures	Drawings	• Concept information such as definitions or facts
• Diagrams	Writing prompts	• Text book notes
• Flow charts	Poems	• Film or video notes
• Homework	Songs	• Guest speaker notes/questions
• Worksheets	Self reflections	• Notebook prompt
• Labs	Quizzes, tests	• Direct answers to questions from the book
• Class work or teamwork activities		

An interactive notebook also refers to the interaction of student, teacher and parent in the student's education and serves as a portfolio of student work for the entire year (Trucillo, 2006). It is not only a place for students to do their work and reflect on their class activities, but it is also for the teacher to see the development of student learning, and for the parent to also see how well the child is doing and what they are learning. In this way, all stakeholders have the opportunity to reflect on student work.

Teachers can also create their own version of interactive notebooks that can help them to monitor the use and effectiveness of the notebook during the year. According to Bower, Lobdell, and Owens (2005), teachers should informally assess the notebook on a regular basis, to give students immediate feedback. Teachers should check student homework and any work done on the left side of the notebook. Teachers should also formally collect and grade the notebooks every three to four weeks. If teachers plan on grading the notebooks, students should be provided with a clear set of criteria for what is expected.

As students begin to put the interactive notebooks together, teachers should monitor the notebooks frequently during the first couple of weeks (Bower et al, 2005). Monitoring will ensure that students are keeping the notebook organized as well as providing helpful comments and suggestions.

Overall, interactive notebooks can be used by teachers to make sure that students are presented with content and understand it through their interactions and reactions to the material. They are also an organizational tool for teachers and students.

Chapter 2

Critical Literature Review

Research on the brain and learning

While it is not essential for teachers to understand the detailed workings of the brain, a basic knowledge of the brain can help teachers plan lessons that meet the needs of their students. The brain is divided into several different regions, each one affecting how students learn. A basic overview of the brain shows that it is divided into two hemispheres, the right and the left. Each hemisphere manages several of the different functions of the body (Appendix B). The ability of different parts of the brain to perform unique functions is known as specialization (Sousa, 2001).

The left side of the brain is the logical hemisphere. “It monitors the area for speech, is analytical, and evaluates factual material in a rational way. It understands the literal interpretation of words and detects time and sequence. It also recognizes words, letter and numbers as written words” (Sousa, 2001). The right side of the brain is the intuitive hemisphere which gathers information from images, interprets patterns and body language, emotional content and tone of voice. The right side also uses spatial perception, is creative and recognizes faces, places and objects (Sousa, 2001).

While each hemisphere in the brain specializes in different tasks and abilities, both sides work together and are capable of synthesizing information. The brain does not appear to have any limitations. It is an open, “parallel-processing system continually interacting with the physical and social worlds outside. It analyzes, integrates and synthesizes information and abstracts generalities from it” (Sousa, 2001). The interactive notebook is a strong tool to use to increase and strengthen input into the brain through output. Interactive notebooks are successful because “they use both the right-and left-brain hemispheres to help sort, categorize, and implement new knowledge creatively” (Young, 2003).

The brain is divided into six different sections: the frontal lobe, temporal lobe, motor cortex, parietal lobe, occipital lobe and the cerebellum (Appendix C). The frontal lobe deals mostly with decision making- planning, problem solving and thinking. The temporal lobe manages auditory information, speech and some part of the long-term memory. The occipital lobe is mainly used for visual processing while the parietal lobe deals with processing feeling, touch, orientation, calculation and some types of recognition. The motor cortex controls body movement and works with the cerebellum to coordinate the learning of motor skills. The cerebellum coordinates the movements of the body. (Sousa, 2001, Stickel, 2005) All of these sections work together and independently to the benefit of the individual.

The six sections of the brain have areas of specialization. All of the parts of the brain work together as neurons and dendrites carry information from one cell to another throughout the brain and to other parts of the body. The information in the neurons is carried by the dendrites and between each dendrite is a synapse. As the synapses are changed and excited by the dendrites, learning happens. “Learning occurs by changing the synapses so that the influences of one neuron on another also changes” (Sousa, 2001). It is important for teachers to understand that learning takes place when the neurons are changed and affected by the connected dendrite through the synapse. Once the neurons have been changed and learning has occurred, the information goes into short term memory. The brain can only hold information in the short term memory for short periods of time. One of the goals of teachers therefore is to move the information into the student’s long term memory. Once the information enters the brain, teachers have about 15 seconds to move the information to long-term memory before it is discarded (Tileston, 2004). One way for teachers to begin to move information into long-term memory is by informing the students that everything on the right side of the notebook is important

information for the test and future. However, that alone is not enough because the students need to be able to retrieve the information once it moves into long-term memory.

“Long-term memory refers to the process of storing and retrieving information. Long-term storage refers to where in the brain memories are kept. Think of the long term storage sites as a library and of the long-term memory as a librarian who retrieves information and returns it to its proper storage places” (Sousa (1995).

Teachers need to understand that in order for students to retrieve memories and information from the storage sites, these have to make it to the storage sites. Sprenger (2002) notes that development of each area of the brain must be considered as we decide what to teach and how to teach it. For example, to get students attention we must first deal with the parts of the brain that control emotions before reaching the frontal lobes where higher order thinking takes place. Teachers should know that most long term memory functions are found in the amygdala (Appendix D) which houses the emotional system in the brain. It is important to remember when planning lessons for long term storage in the brain that most long term memory is located in the emotional system.

There are two questions teachers should ask themselves when planning lessons for students to retain for the future. Those questions are: “Does this information make sense?” and “Does this have meaning?” (Sousa, 2001). If the lesson does not answer one or both of those questions then it is harder for the students to process the information into long term memory. According to Gagne and Driscoll (1988), the presented information or stimuli must be relevant to the student for learning to take place. A teacher can more clearly see if a student understood the information and was able to make sense of it or attach meaning to it when the student is asked to

demonstrate the information in their own way on the left side of the notebook. This can be done through a picture, cartoon, summary or any number of ways. This would be a good way for the teacher to assess the student's understanding.

Another way that a teacher can try to answer the two questions is by doing activities that have immediate connections to the "real" world, thus increasing the use of dendrites which impact learning (Kaufeldt, 1999). When students work on "real" life problems, they are making connections to what they already know which helps to answer both questions. Interactive notebooks can be used by the teacher as an organizational tool for posing those problems and providing some information. The teacher can provide students with as much or as little information as desired on the right side of the notebook while the students can begin to brainstorm, illustrate and solve the dilemma on the left side. Once the information has made connections in the brain, it is important for the student to retain it. Not only do teachers want students to learn the information but they also want it stored in long term memory in a manner in which it can be retrieved. "Retention refers to the process whereby long-term memory preserves a learning in such a way that it can locate, identify, and retrieve it accurately in the future" (Sousa, 2001).

Teachers can help students retain information through rehearsal. If a student rehearses information, then it is processed and reprocessed. This is critical for how information is stored in long term learning. An interactive notebook will allow students the opportunity to rehearse information they have just learned.

As the student is processing and reprocessing the information, transfer can be taking place. When students take the information they have been presented and use that to produce a drawing, written summary or something that shows they comprehend what has happened during

class time, students are rehearsing and transferring information. Transfer helps student to connect old information with new information and associate them (Sousa, 2001). By transferring knowledge and making connections with previously learned information, students now have several ways to retrieve the information stored in their long-term memory. The brain seeks to detect familiar and useful patterns in information. It is looking for familiar ways to store information and connect it with existing knowledge. These patterns help to create context to what might otherwise be interpreted as meaningless (Kaufeldt, 1999). They help make the information easier to store and access. Patterns can also help students create more connections between wide ranges of knowledge. According to Stickel (2005), “students can better demonstrate knowledge and skills with several ways to both retrieve information and demonstrate their knowledge”. Since students retain information better when their brain makes connections between the information being taught and what that means to them, it is important for teachers to require and invite learners to make connections between the learning and what is already stored in their brain (Caine, Caine, McClintic, & Klinek, 2005). An interactive notebook provides students with several ways to demonstrate their knowledge on the left side of the notebook and at the same time connect with previous information.

Once teachers understand the brain’s vast “natural capacity to integrate information, then they will realize that immense amounts of information and activities can be presented and assimilated” (Caine & Caine, 1991). According to some brain researchers, 99% of what we learn comes to us through our senses: touching, tasting, hearing, smelling and seeing (Tileston, 2004). “Ninety percent of all information that comes into our brain is visual” (Jensen 1996). Additionally, Jensen (1997) states that “87% of learners in the classroom do not learn just by hearing” or in other words “20% of students learn auditorily, the other 80% learn visually,

kinesthetically or in some other manner” (Tileston, 2000). However, most teaching done in the classroom is presented through the auditory sense (Jensen, 1996).

The brain seems to be designed to be able to pay attention for short stretches of time (Tileston, 2004). Most students do not rely on just one sense when they are learning. Rather they need exposure to the information through several senses to help them learn the information. They also need movement. An interactive notebook can be a helpful tool for teachers to use when planning lessons that incorporate as many senses as possible as well as movement. Because interactive notebooks are literally spiral notebooks, all handouts and worksheets have to be glued or stapled into the notebook. One way to give the brain a break and allow for movement can be during these tasks. It does not have to encumber a great amount of time but it will allow the student to move and keep the information organized in the notebook. Additionally, the notebook allows for visual students to see the information presented, the students can hear the information and work on recording it in the notebook. While an interactive notebook may not physically accommodate tasting, smelling or touching items, students can draw pictures in the notebook, or describe materials they have tasted or smelled.

All students learn information in a different manner in part due to the differences in interactions between the sections of the brain. Individual students can demonstrate their own understanding on the information on the left side of the notebook, while teachers use the right side of the notebook to enhance the learning of all students. In the same way, Ellis and Fouts (1993) encourage educators to take a whole brain approach to teaching. By teaching to both sides of the brain students can gain a comprehensive understanding of content through a variety of strategies and activities. Learning is structured to meet the needs of students both in the way their brain processes information and through multiple intelligences.

Multiple Intelligences and the interactive notebook

As teachers learn more about the brain and the way the brain processes information into long-term memory, the complexity of the brain and learning becomes more apparent. It also leads teachers to think about how all students do not learn the same way. There are differences in the preferred learning styles that students have and what works best for them. Howard Gardner has been a leading researcher in the area of multiple intelligences (Gardner, 2006). Gardner's eight multiple intelligences provide a conceptualization of the brain's complexity and the wide range of ways that students learn (Stickel, 2005).

Basically, Gardner believes that students learn better through some of the intelligences than others. His eight intelligences include verbal/linguistic, logical/mathematical, visual/spatial, musical/rhythmic, bodily/kinesthetic, interpersonal, intrapersonal and most recently naturalist (Gardner, 2006; Kagan & Kagan, 1998; Gardner, 1993; AASA, 1991).

The verbal/linguistic intelligence focuses on reading, writing, listening, and discussing. The logical intelligence is the ability to think in words and use language to express meaning (Campbell, Campbell & Dickinson, 2004). The logical/mathematical intelligence is stronger in questioning, thinking and problem solving. It makes calculations, considers propositions and hypotheses as well as carrying out mathematical operations. The visual/spatial intelligence is "the ability to form a mental model of a spatial world and be able to maneuver and operate using that model" (Gardner, 2006). Visual/spatial intelligence helps students to think about concepts in three dimensional ways, encode and decode information and create, transform or modify images. The musical/rhythmic intelligence emphasizes rhythm and music in learning and expressing oneself. A student with musical/rhythmic intelligence is sensitive to pitch, melody, rhythm and

tone (Campbell et al, 2004). Bodily/kinesthetic intelligence uses the body or parts of the body to solve problems and make products through movement and hands-on strategies. “Interpersonal intelligence is the ability to understand other people, what motivates them, how they work, how to work cooperatively with them”, while intrapersonal intelligence is the ability to work with oneself and operate effectively in life through reflection (Gardner, 2006). Lastly, the most recently described intelligence is the naturalist intelligence. The naturalist often focuses on classification, observing patterns in nature, understanding natural and human-made systems as well as comparison and observation strategies when learning (Kagan & Kagan, 1998).

Given this complexity, Sprenger (2003) incorporates the eight intelligences along with visual, auditory, kinesthetic modes of learning and “memory lanes” such as semantic memory (e.g. lists and words) and episodic memory, a type of factual memory. The theory of multiple intelligences can be combined with research about the brain and used to help students achieve success. Interactive notebooks can help the teacher put all of the research into practice.

It is important to understand the difference between learning style and intelligence.

“The concept of learning style designates a general approach that an individual can apply equally to every conceivable content. In contrast, an intelligence is a capacity, with its component processes, that is geared to a specific content in the world. A person with a high intelligence in my sense of the term is one whose computational capacities are very effective with a particular form of information or content” (Gardner, 2006).

In other words, a learning style is a way students can approach all content and curriculum to help them learn. An intelligence refers to the way in which a student learns best. For example, a student who learns new melodies and lyrics easily is strong in the musical/rhythmic intelligence but could have trouble with problem solving, because he or she is weaker in the area of

logical/mathematical intelligence. The student might try to approach the problem through the use of his or her musical/rhythmic intelligence (Gardner, 2006). Intelligences are “a set of skills of problem solving- enabling the individual to resolve genuine problems of difficulties that he or she encounters, and when appropriate, to create an effective product- and must also entail the potential for finding or creating problems- thereby laying the groundwork for the acquisition of new knowledge” (Gardner, 1983).

While educators recognize that all of the different intelligences exist, it is important for them to understand how they affect student learning. Within these multiple intelligences, students have different combinations and degrees of each intelligence. The intelligences are rarely used independently but rather are used concurrently and often complement each other as students develop skills and solve problems (Brualdi, 1996; Black, 1994). Sousa (1995) says that “teachers need to understand that students with different sensory preferences will behave differently during learning and that teachers tend to teach the way they learn”. This helps to explain why some students have trouble learning from one teacher but could learn more easily from another. If teachers are aware of their own learning preferences, they can make a concerted effort to incorporate the other intelligences. Ellison (1992) noted that the multiple intelligence theory can be used to set educational goals to help students reflect on better ways of learning in the classroom.

Interactive notebooks can help teachers meet the needs of their students as an organizational tool to help them plan lessons that involve the use of different intelligences. For example, if a student is particularly strong in the visual/spatial intelligence, the interactive notebook can help the student to stay organized and see that pattern of the curriculum. The right

side of the notebook would allow the teacher to provide structured information to the student that builds on the learning they already know.

“It has now been established quite convincingly that individuals have quite different minds from one another. Education ought to be so sculpted that it remains responsive to these differences” (Gardner, 1993). “Students’ exhibit different learning styles and multiple intelligences, and only by accommodating these various abilities can instructors properly plan and conduct assignments and assess what students have learned” (Manner, 2001). Gardner (1995) described the multiple intelligence strategies that provide many opportunities for children to achieve success in school.

Educators can use multiple intelligence strategies to enrich the curriculum to assist all students to become successful learners (Greenhawk, 1997). Using multiple intelligence strategies enables the teacher to develop a plan that is unique for the ability level of the learner (Bellanca, 1998).

“The theory of multiple intelligences makes things simpler. By chunking the broad range of human abilities into basic intelligences, a map [is provided] for making sense out of the many ways in which children learn and a blueprint for ensuring their success in school and life” (Armstrong, 1994).

An interactive notebook can help the teacher to map out learning for their students by planning lessons that reach the different intelligences in the classroom.

“When teachers are able to use different pedagogical approaches, they can reach more students in more effective ways” (Gardner, 1999). “Knowing that people learn in different ways, you (the teacher) use a comprehensive model that provides for the major differences” (AASA, 1991). In the classroom, the wider the range of skills and instructional approaches that can be

used in the classroom, the better it is for the students. “It has been shown that explicitly engaging students in the creation of nonlinguistic representations stimulates and increases activity in the brain” which teachers can do through interactive notebooks (Gerlic & Jausovec, 1999).

Students should be given the opportunity to participate in a variety of nonlinguistic activities in the classroom (Marzano, Pickering & Pollock, 2001). The left page of the interactive notebook is where the students can express their understanding of the information in nonlinguistic ways. Some examples of nonlinguistic activities involve the use of graphic organizers, physical models, generating pictures and participating in kinesthetic activities. For example, a student could demonstrate understanding of a vocabulary term by drawing a picture of its meaning.

While it is important to know that students work best with varied materials and opportunities, it is crucial to keep in mind where their strengths and weaknesses are in the eight intelligences. “In most areas of the curriculum, materials can be presented in a plethora of ways—by teachers or through books, software, hardware, or other media. The choice of mode of presentation can in many cases spell the differences between a successful and unsuccessful educational experience” (Gardner, 1993). Interactive notebooks can be a useful choice of media to use in the classroom that can create a positive academic experience. “Children learn best when they are actively involved in their subject matter; they want to have the opportunity to work directly with materials and media; and in the arts, these strengths and inclination almost always translate into the making of something” (Gardner, 1993).

Teachers should encourage students to use their strongest intelligences, but also help them to develop their less dominant abilities and reflect and analyze their own learning styles and ways of thinking (Brualdi, 1996). Therefore, it is important for teachers to incorporate as

many of the different intelligences into their lessons as possible in order to challenge all students to improve in weaker areas and still promote their areas of strength. While it is the goal of the teacher to include as many intelligences as possible in a lesson, including all eight in one lesson is virtually impossible. There is no point in assuming that every topic can be effectively approached in at least seven to eight ways, and it is a waste of effort and time to attempt to do this (Gardner, 2006). Teachers should focus on incorporating the intelligences that fit with the lesson and can improve it. By using an interactive notebook, the teacher can organize and plan for lessons that would incorporate those intelligences.

Interactive notebooks can be used to help teachers organize and present information in a variety of way. The interactive notebook can be used for the verbal/linguistic intelligence when the teacher presents the students with written notes that they talk about as a class. Those notes go on the right side of the notebook and the verbal/linguistic student would excel when they review the notes as well as during class when the discussion and lecture occurs.

The logical/mathematical student would also appreciate the structure of the notebook. An interactive notebook can be arranged to show progression throughout a unit or school year which appeals to the needs of the logical/mathematical student. The teacher can also create problem solving situations to go on the right hand side of the notebook. For example, doing some problem based learning in groups. By creating lessons that can be housed in the interactive notebook through the use of directions and worksheets, and completing those in groups, the interpersonal student can benefit from interaction with their peers in a stimulating manner.

There are some limitations to the interactive notebook particularly for the students who are musical/rhythmic and bodily/kinesthetic. When students have to put together the notebook by

gluing the pages in, it helps the bodily/kinesthetic learner move about but does not necessarily enhance their learning.

Overall, interactive notebooks have the potential to work well within the research done about students learning and incorporating as many multiple intelligences into the classroom as possible. As long as teachers realize that “each student has a very different mind; each is attracted to, comfortable with, and in turn becomes skilled with different kinds of stimuli” then they can plan lessons to meet those students needs (Kagan & Kagan, 1998). Interactive notebooks are one way to do that.

Note taking and the interactive notebook

Once teachers understand how the brain is structured and that students have a variety of intelligences that inform their learning, there are a variety of learning strategies that a teacher could incorporate in his or her classroom. A learning strategy can be used to rehearse, organize, and elaborate on presented material to make it more meaningful (Kenny & Schroeder, 1994). Note-taking is one of those learning strategies. Note-taking has been a topic of research for the last 30 years and taking notes is a common classroom activity (Armbruster, 2000). Interactive notebooks are wonderful to use with classroom instruction to accommodate a variety of types of note taking. Therefore, it is important for teachers to understand the research behind note-taking and review some of the formats for taking notes.

The process of taking notes actively engages students in the learning process which increases comprehension. It also encourages the clarification of confusing content or terms which helps long-term memory (Weishaar & Boyle, 1999; Ruhl & Suritsky, 1995). There are two broad categories under which note taking can fall; teacher-directed and student-directed.

“Teacher directed techniques are those that students can use to improve their knowledge of subject matter during lectures” (Weishaar & Boyle, 1999). An example of teacher-directed note taking is when students copy down notes during a lecture and then work in groups to clarify points. Student-directed techniques involve the use of strategies for note taking, guided notes, or column notes. In these cases, the students are provided with an outline of what to anticipate and fill in the missing pieces during the class (Weishaar & Boyle, 1999). The interactive notebook is helpful because it requires the students to be engaged in the classroom. Students are required to pay attention in order to take effective notes. In this case interactive refers to the fact that the notebook involves the student’s participation and engagement in the content (Stencel, 1998).

DiVesta and Gray (1972) distinguished the encoding and external storage functions of note-taking. Encoding occurs when the act of note-taking alters the learner’s cognitive processes. By forcing students to organize information and relate material to existing knowledge, students must pay close attention and take notes that facilitate learning (Peper & Mayer, 1986). Notes serve an external storage function when students have something to review. Both functions have been shown to facilitate learning across a wide range of conditions, but the external storage function has stronger impact on learning (Kiewra, DuBois, Christian, McShane, Meyerhoffer, & Roskelley, 1991; Kiewra, 1985a). Bretzing and Kulhary (1979) compared note-taking that indicated in-process encoding with verbatim note-taking and found that subjects who took verbatim notes scored lower on comprehension tests than those who processed information at a higher level while they took notes. Anderson and Armbruster (1986) concluded that there is a benefit to students when the classroom lecture permits the students to process the content while taking notes.

There are a variety of instructional strategies that a teacher could use in the classroom from identifying similarities and differences, homework and practice, group work, questions, cues, and advance organizers as well as note taking. Marzano, Pickering and Pollock (2001) found that summarizing and note taking are an effective instructional strategy that teachers can use to improve student achievement. Kiewra (1985b) reported that “students who received lecture notes provided by the instructor for review generally achieved more than students who reviewed from their own notes before an assessment”.

It is important for students to see the relationship between quality notes (as in completeness and accuracy) and learning (Armbruster, 2000). Student notes are often limited in content (only containing about 35% of the presented material) and can be incorrect (Kiewra, 1985a). Locke (1977) found that students received higher grades on assessments when they had more thorough, complete notes. Collingwood and Hughes (1978) discovered that students had better achievement if they were provided with quality notes rather than personally recording them. Knight and McKalvie (1985) also found that students who review a provided set of good notes outperform students who took notes and then reviewed their own notes for an assessment. By providing students with an outline of the material to be covered, the quality of the notes taken (Kiewra, Benton, Christensen, Kim, & Risch, 1989) and test performance after review improves (Kiewra, Dubios, Christian & McShane, 1988). Partial notes relieve students from some of the copying of terms, allowing for more focus on understanding and encoding (Armbruster, 2000; Kiewra et al., 1988; Kiewra et al., 1991). By allowing more focus on relating ideas within the lesson, internal connections, learning and recall are enhanced. (Barnett, 2003). Providing students with the opportunity to relate the lesson concepts to prior knowledge, understanding and transfer should be enhanced (Peper & Mayer, 1986; Mayer, 1984). After the lesson, the notes

provide students with a tangible product that can be retrieved and used again once the class has moved to other topics (Kenny & Schroeder, 1994).

Interactive notebooks house notes that have been provided during classroom lessons. As the class reviews and learns material, the notes are glued into the right side of the notebook. The right side of the notebook is where all information that is important for assessments is kept. The interactive notebook provides location for all information for review at later dates. Notes serve two purposes: 1) aiding in student understanding of content; and 2) reference material for later study (Rhul & Suritsky, 1995; Henk & Stahl, 1985).

Teachers can guide instruction in the many different ways that students can take notes. For example, outlining is an appropriate note-taking form when students are learning about a hierarchical organization of concepts and subconcepts. Charting allows the students to record numerous interconnected pieces of information. Concept maps help show relationships between concepts (Stein, 1988). Students can also learn to take notes in a column format or with Venn diagrams. It is important for teachers to consider whether they want students to stay busy taking notes but not necessarily understand the information or do they want to provide the students with some type of note taking format so that more time can be spent on comprehension of the topic. If a teacher wants students to comprehend the material being presented, then he or she should provide students with opportunities to demonstrate understanding. Interactive notebooks allow for students to do both.

McAndrew (1983) suggested that instructors use a spaced lecture format, insert verbal and nonverbal cues into the lesson to highlight the structure, write important material on the blackboard, avoid putting too much information on transparencies and slides, tell students what

type of assessments to expect and use handouts that provide the students with extra room to add their own notes.

When teachers provide students with notes it helps to reduce the number of student errors through copying and spelling mistakes which can affect the comprehension of the material (Stencel, 1998). This also helps to reduce the time and effort placed on writing notes that students and teachers need during a lecture. Instead students can concentrate on the information being presented instead of focusing on their writing (Wilson, 1994; Collison, 1992). All notes should be considered a work in progress. As the class lesson progresses students can add and adjust the information in their notes. Additionally, notes should be used by students as study guides for assessments and according to Marzano, Pickering and Pollock (2001), the more notes that students have the better. This provides them with a larger view of the information and can help in comprehension. Interactive notebooks provide students with the opportunity to add and adjust their notes, review notes at a later day, and have quality amounts of notes.

There are a number of ways that teachers could approach note-taking in their classroom. Allen (2002) suggests that the teacher could pause every so often and give students a short period of time (perhaps a minute or two) to look over what they have written and ask questions. Students could also be encouraged to draw symbols, diagrams, or even doodle related to that material which would help trigger their memory for later discussion. According to Young (2003), students should be encouraged to “take notes” on the information that they have been given through lectures, discussions or outlines on the right side of the notebook. Then on the left side of the notebook students should be encouraged to “make notes” about the content by writing questions, sketching, or recording comments. This helps students to make connections, which aids in comprehension. According to Gredler (2005), learners construct their own meanings for

themselves and from the contexts in which they live. It is up to teachers to help provide all of the information necessary for students to connect meaning for comprehension.

The interactive notebook is designed to accomplish that, on the right side of the notebook is all of the information students need to know for assessment. The information could be provided in a variety of ways by the teacher. Then the left side of the notebook is where the student can summarize or create visual cues to help them remember the lesson later on. In addition, all of the information is housed in one place so it is easy for students to find and study it. The table of contents located in the front of the notebook helps students to know what information is being presented on each page. According to Stencel (1998), “the interactive notebook should help students improve their test scores and final grades”. One of the most positive aspects of interactive notebooks is that it “helps students interact with the text and decide on the meaning it holds for them” (Wroblewski, 1985).

Teachers’ Curriculum Institute

Teachers’ Curriculum Institute (TCI) has incorporated the use of interactive notebooks into its curricular materials. TCI was founded in 1989 by a small group of social studies teachers who were deeply committed to revitalizing the teaching of history. TCI’s mission is to empower educators across the nation to teach social studies with a passion and to bring learning alive to all learners. Committed to setting a new standard for excellence in social studies teaching, TCI has based its innovative social studies and training programs on the powerful TCI Approach – a set of proven teaching strategies and practices that bring history to life and achieves consistent, positive classroom results while still being mindful of educational standards. TCI’s core products consist of innovative components customized to complete each core program, including lesson

guides, student editions, interactive student notebooks, overhead transparencies, placards, Sounds of History audio CD, and digital teacher resources CD-ROM—all skillfully crafted together to fully support the implementation of the TCI approach (Cabalo, Newman, & Jaciw, 2006).

TCI's methodology promotes the use of interactive notebooks as a way to help improve student achievement. Interactive notebooks are an integral part of the TCI program. Each student uses a spiral bound notebook to combine materials, cutting and pasting to create their own unique notebook. TCI uses interactive notebooks because they are engaging for students. Students have the opportunity to “be active participants in their learning” (Bower, Lobdell, & Owens, 2005). These notebooks encourage students to use a variety of intelligences. According to Bower, Lobdell, and Owens (2005), students can use their visual intelligence through elements like graphs, maps, illustrations; musical intelligence by composing lyrics; intrapersonal intelligence by reflecting on the ways topics have affected them personally. Students can use their interpersonal intelligence by recording group discussions and their logical mathematical intelligence through sequencing of events. Interactive notebooks help students to systematically organize as they learn and the notebooks become a portfolio of student learning.

Students can create unique interactive notebooks by designing their own covers, creating an author page about themselves, and using colored pencils, markers, scissors, glue sticks, highlighters for notebook assignments. In this way, interactive notebooks provide a cohesive structure to the lessons which helps teacher meet the needs of the students.

In 2006, the Empirical Education Incorporation completed a research project funded by the federal government about the TCI *History Alive!* program. This study involved nine California teachers. Though there were limitations in this study, the overall conclusion was that

the TCI program was beneficial to low achieving students and students learning English (Cabalo et al, 2006). The interactive notebook, as a core component of the program was important to the success of those students, although no direct correlations were made. This is one of the first studies done on a product that involves the use of interactive notebooks in a curriculum program. Additional research needs to be done to study and correlate more closely student achievement to the use of interactive notebooks.

In Summary

Learning is the acquisition of a variety of skills and strategies that are needed to function. “Brain research establishes and confirms that multiple, complex, and concrete experiences are essential for meaningful learning and teaching” (Caine & Caine, 1991). Every student has a brain that is unique and learns in a unique manner. Learning should be designed to meet these unique needs. Learning can also contribute to a rich and diverse life for the student (Gredler, 2005). It is the teacher’s job to plan, design, select and supervise lessons that can activate student learning and help begin to create that diverse knowledge for life (Gagne & Driscoll, 1988). The challenge is for teachers to use different modalities to activate student learning to meet the needs of different learners in the classroom by using a variety of techniques and styles (Ellis & Fouts, 1993). Interactive notebooks help teachers accomplish that. The right side of the notebook is used for information that is important for the student to learn and can be presented in a variety of ways, while the left side of the notebook is where students can express their understanding of the material. When students understand the content, they can explain the concepts in their own words, apply the information to new contexts appropriately, and make new analogies and generalizations (Perkins, 1991). Both sides of the notebook are designed to help students achieve

success academically by allowing the students to internalize and personalize the content being presented.

Chapter 4

Advantages and Disadvantages of Interactive Notebooks

Advantages

Interactive notebooks have many benefits for students and teachers in the classroom. Interactive notebooks allow students to systematically organize information as they learn which helps them to be efficient in the classroom. In fact, interactive notebooks demand that students stay organized and help them to achieve that through the table of contents at the beginning of the unit, numbered pages, as well as a teacher's model notebook.

In addition to helping students stay organized, interactive notebooks also help teachers to plan lessons that meet the learning styles and intelligence needs of students. Interactive notebooks can help teachers to create meaningful and engaging lessons. According to the Teachers' Curriculum Institute (Bower et al, 2005), the interactive notebook can access students visual intelligences through maps, graphs, illustrations, etc; their musical intelligences by composing song lyrics; interpersonal intelligence through reflections; intrapersonal intelligence by recording group discussions and project notes; logical/mathematical intelligence through sequencing and problem solving.

Interactive notebooks allow students to express their creative side. Students are given the opportunity to decorate the cover of the notebook as well as draw inside the notebook for activities related to comprehension; some students develop a sense of pride in the notebook and take better care of it. The students want to show their cover and drawings to classmates which helps to reinforce the content being covered as they explain the drawings, cartoons, pictures to their peers.

When students are absent, they can continue to be organized by reviewing the teacher's notebook or a peer's notebook. The student can add the missing pages to his or

her notebook without taking time away from the class period. This saves both the student and the teacher time explaining where the missing information goes.

Interactive notebooks can also be used for assessment purposes, formally and informally. They can be useful when teachers are trying to gauge student learning. Looking at the left side of the notebook, where students demonstrate their understanding of the content, determines which students grasped the content and which ones did not. Interactive notebooks can also be graded for completion and organization. If teachers give open-note tests or quizzes, students can take advantage of the organization of interactive notebooks when working on the assessment.

Students know from the outset that the right side of the page is testable material. This helps them know what to study and review for all assessments. Since interactive notebooks house information for one or several units, it is important for students or teachers to keep the notebooks. These notebooks can then be used at the end of the year for standards based assessment reviews and can also serve as a student portfolio of work which can show improvement throughout the year.

Disadvantages

There are also some disadvantages to using interactive notebooks. Students who do not have strong organizational skills can find interactive notebooks difficult. These students may need help learning how to be organized and stay organized. Interactive notebooks can be a tool to help students learn those organizational skills. Students can clearly see how the notebook is organized with a table of contents and numbered pages, however they may still have difficulty staying organized. Students can have trouble

when they miss class demonstrating understanding of the information on the left side of the page.

Initial organization of an interactive notebook can be time consuming. The teacher will have to put a significant amount of time into the lessons to make sure that the content is demonstrated on the right side of the notebook and that students have the opportunity to work with the information on the left side. While teachers may have to put in a lot of work to plan lessons that fit into the interactive notebook, once it is done teachers can improve their lessons and continue to make use of the interactive notebook.

While interactive notebooks can be used to demonstrate the multiple intelligences, some intelligences do not fit into the set up of an interactive notebook. For example, students have to put together the notebook by gluing the pages in, this helps the bodily/kinesthetic learner move about but does not augment their learning. Naturalistic intelligences would also be difficult to demonstrate in an interactive notebook except through drawings of nature. Teachers should not take the time to try to incorporate all of the intelligences as that would be a waste of time. Teachers have to demonstrate which intelligences are appropriate to use in the notebook.

Another disadvantage of interactive notebooks is that students can lose them. If a student were to lose his or her notebook, it would be hard to replace all of the information in the notebook. The teacher could provide the students with copies of any handouts and the student could put together a new notebook but it would be difficult for them to recapture all of the personalized information on the left side of the notebook.

Interactive notebooks are not the best tool for every subject or unit of study. In English, it can be difficult for an interactive notebook to have numbered pages because

some students write more than other students. However, in most cases, the numbered pages can help students to maintain the correct information on the right page.

Teachers have to decide when interactive notebooks would be a useful tool in their classroom. Teachers have to understand how to organize the notebook in order for it to be effective for the students. The notebooks take time and effort on the part of the teacher.

Chapter 5

Summary

Summary of Findings

Positive student achievement is influenced by teachers who have an understanding of brain research, learning styles and intelligences, and methods of instructing students. This study focused on one way teachers can work to promote student achievement through the use of an interactive notebook. The study focused on the cognitive theories that support the use of interactive notebooks. When a teacher decides to implement interactive notebooks into his or her classroom, he or she must take into account the brain research, learning styles, and intelligence strengths that each student has. Literature regarding the areas of brain research, multiple intelligences and note-taking strategies was examined and synthesized to support the use of interactive notebooks.

The interactive notebook can be an important tool to help students remember and review information needed for assessments. It is helpful for teachers to understand how to set up an interactive notebook in addition to understanding the research behind the use of interactive notebooks. The right side of the notebook can be used for notes provided by the teacher; this is the side that students have to study for assessment. If the students are given information to put on the right side, then the students can use the left side of the notebook to put the information into their own words, drawings, etc. This helps the brain by making connections between what is learned and what the information means to the learner (Caine, 2005).

Once teachers have a basic understanding of how an interactive notebook contributes to academic achievement, he or she can plan lessons to enhance it. Teachers can use information on brain research to inform those lessons. Brain research tells us that

every student learns differently. The different sections of the brain have their own functions but they work together. Interactive notebooks help teachers to tap into the different areas of the brain. The organization and set up of interactive notebooks involve the brain and its structures. The activities and notes the teacher decides to include in the notebook can help to stimulate different regions of the brain. When the brain is stimulated and the neurons are involved, learning occurs.

Teachers know students have a wide range of interests and abilities. Because each student has a different learning style, the teacher must accommodate these abilities, in order to properly plan assignments and assess what students have learned (Manner, 2001). Therefore, teachers need to take into account the learning styles of their students. Interactive notebooks help teachers to integrate a range of learning styles to meet the needs of the students. Teachers can incorporate drawings, activities, column notes to promote student achievement.

Teachers know that students have different intelligences. Students tend to be strong in some intelligence areas and weak in others but it is important for students to be exposed to all types of intelligences. Interactive notebooks are one way for a teacher to plan lessons that involve the spectrum of intelligences. These notebooks provide teachers with an organizational tool for their lessons.

As teachers begin to plan lessons that incorporate the range of intelligences, they also have to take into account strategies that will help students. Note-taking is an effective, proven strategy. The process of taking notes actively engages students in the learning process which increases comprehension. When students are involved with note taking, they retain an understanding of the content. Students can also use the notes as

reference for assessments. Interactive notebooks can be used with classroom instruction and can accommodate a variety of types of note taking. Interactive notebooks can help students' process information, review for assessments and personalize the content knowledge being presented. They also provide students with the opportunity to add and adjust their notes, review notes later on, and have quality notes. Overall, an interactive notebook is an organizational tool for teachers and students.

One aspect of interactive notebooks is students are required to interact with the information and figure out what it means. The right side of the notebook is used for information that is important for the student to learn and can be presented in a variety of ways while the left side of the notebook is where students can express their understanding of the material. When students understand the content, they can explain the concepts in their own words, apply the information to new contexts appropriately, and make new analogies and generalizations (Perkins, 1991). Both sides of the notebook are designed to help students achieve success academically by allowing the students to internalize and personalize the content being presented.

The findings of this study indicate that interactive notebooks can serve as a useful tool for teachers and students in the classroom. This is supported by the theories that were examined during the study. There are advantages and disadvantages to the use of interactive notebooks that teachers must take into account when deciding whether or not to use it. Research still needs to be done on interactive notebooks and their effectiveness with student achievement.

Conclusions

Interactive notebooks are organizational tools for teachers and students alike. For teachers, the notebooks can be used to help plan lessons that meet the needs of the students based on their intelligences and learning styles.

Students can use interactive notebooks to stay organized, because they require students to keep a table of contents and glue particular pieces of information on certain pages, students have to learn to stay organized. Students are also provided with the opportunity to demonstrate their understanding of the information from the lesson on the left side of the notebook. Interactive notebooks can be used by students during a review of a unit or before standards based testing.

The use of interactive notebooks is supported by research on the brain, multiple intelligences, and note taking.

Recommendations and Implications for Practitioners

Teachers need to be exposed to interactive notebooks as an effective classroom tool for increasing student achievement. However, because there are times when interactive notebooks are not the best choice for a unit of study, teachers need to discriminate when interactive notebooks are appropriate. They need to weigh the advantages and disadvantages of interactive notebooks as they decide when to use them. When used properly, interactive notebooks can be effective organizational tools for the teacher and students.

Further research is needed in the field of interactive notebooks. There is very little research about the benefits or limitations of interactive notebooks. No research has been done that directly correlates student success to the use of interactive notebooks in the

classroom versus a use of the traditional binder. Research needs to be done that directly correlates student achievement levels and success to interactive notebooks. A study needs to be designed that correlates the two pieces.

A study that correlates interactive notebooks to student achievement could be difficult to design. Much of the information being used to promote the use of interactive notebooks is influenced by the teacher. The teacher must be the one to use the variety of instructional methods and be aware of the different learning styles of the students. The interactive notebook is a way to organize the information being presented. The teacher has an important role in the effectiveness of the interactive notebook. Nevertheless, interactive notebooks are being widely used in the classroom and should be examined more closely.

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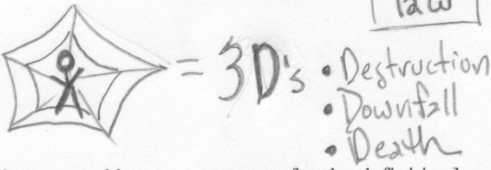
Appendix

Appendix A

Sample of an interactive notebook

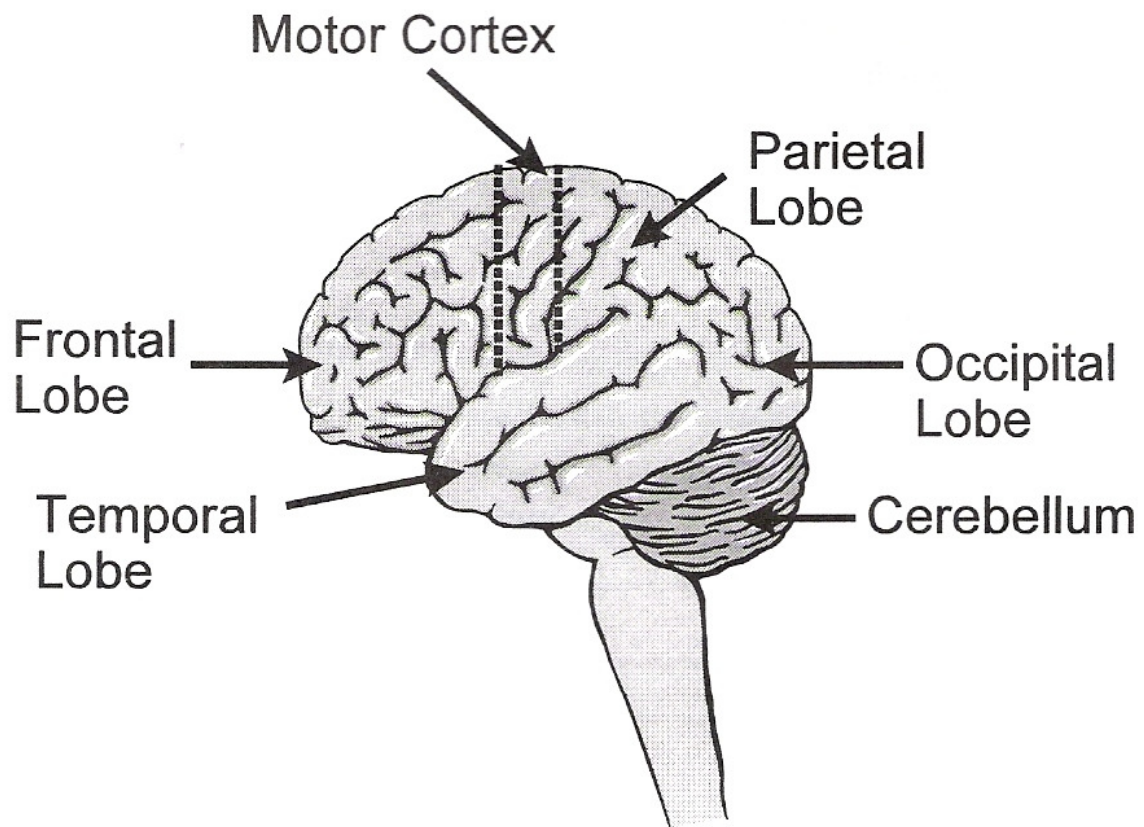
What does it look like?

The following is an example of what an interactive notebook might look like; the students reviewed and took notes on the literary terms they would be using as they read and discussed Shakespeare’s *Romeo and Juliet*. On the right side is an excerpt of a student’s notes, and on the left side are the student’s interactions with the information. Students started their interactions as a class closure activity and finished them for homework.

Closure / homework on class notes 10/2/03 Due: 10/3/03 [Student made a connection to content from her science and social studies classes] W.S. was a contemporary of Galileo, an Italian astronomer and physicist – heliocentric theory – both men were great renaissance thinkers (born the same year!) [Student reduced the definition to the essential elements and created some visual symbols] Tragedy: play / person / tragic flaw / moral law  = 3D's • Destruction • Downfall • Death [Student created her own acronym for the definition] Soliloquy = SAIL S = Alone on stage Innermost thoughts Long speech	<u>Romeo and Juliet</u> 10/2/03 Literary Terms William Shakespeare (1564-1616) Tragedy- is a long, dramatic work that traces the career of a noble person who has a tragic flaw that causes him/her to break some moral law. The hero then becomes entangled in a web of circumstances that bring about his/her downfall or death. Soliloquy- is a long speech given by a character alone on stage that expresses his/her innermost thoughts and feelings
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Appendix B

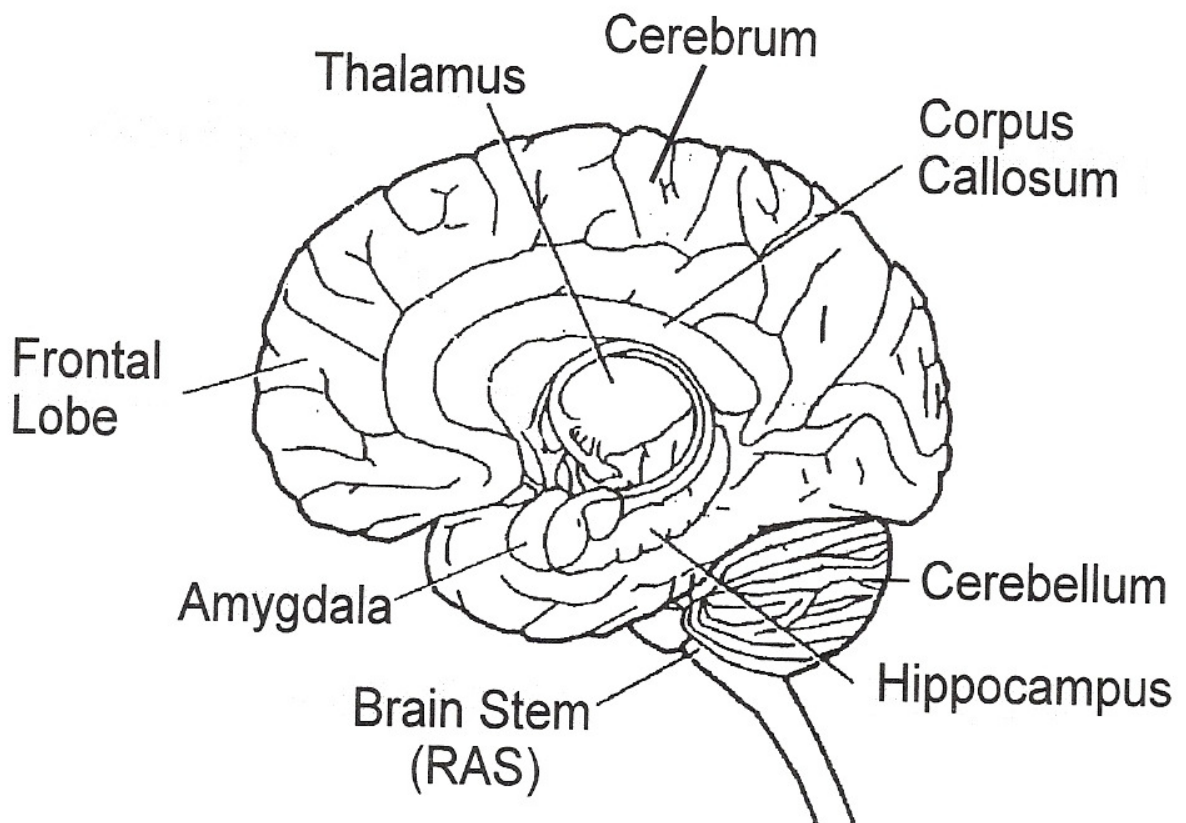
This diagram shows the four major lobes of the brain as well as the motor cortex and cerebellum.



(Sousa, 2001)

Appendix C

A cross section of the brain



(Sousa, 2001)

Appendix D

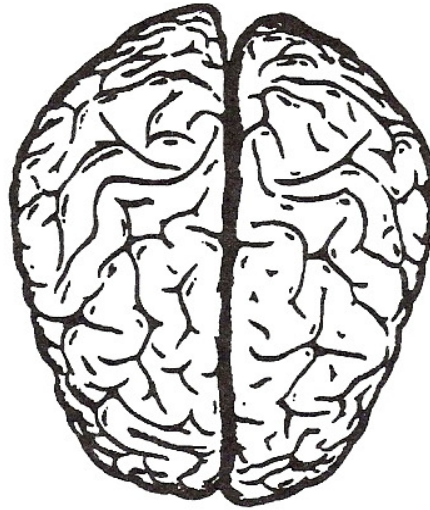
Specialization of the right and left hemispheres of the brain

LEFT SIDE

Analysis
Sequence
Time
Speech

Recognizes:

words
letters
numbers



RIGHT SIDE

Creativity
Patterns
Spatial
Context

Recognizes:

faces
places
objects

(Sousa, 2001)