How Does the Impact of Student-Generated Graphic Organizers and WSII Software Enhance the Comprehension Levels of a Diverse Adolescent Population?

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Introduction

In World Studies II classes, the Standards of Learning (SOL) dictate that tenth grade students must cover history and geography from the later Middle Ages (1000 A.D.) to the present. This is a lot of content information that students must learn in nine months. Secondary students must meet the demands of content driven classes. Besides content area classes, secondary students must handle adolescent problems as well as literacy skills. These pressures can cause some students to “shut-down” or develop an attendance problem.

Adolescence is a critical period in human development. During this critical period, adolescents go through a lot of changes. Changes in family, socioeconomic status, relationships and schools (middle school to high school, transferring from another school) can be traumatic to teenagers. Every day that I teach, I always have one student who seems perplexed, depressed, tired, occupied, or unenthusiastic. These are the students who work to support their families, lack parental involvement, lack basic reading skills, arrived in the US without knowing much English, are identified as LD (learning disabled) ED (emotionally disturbed) or LEP (limited English proficient), are suicidal, did poorly on their IB (International Baccalaureate) exam, or dislike a particular teacher who seems to not understand their culture. Teenagers have many things going on in their lives that affect their self-esteem. Academic and peer pressures do not always go “hand-in-hand.”

Next, teenagers must handle literacy skills. Self-esteem can be tough for an adolescent who has a Gates MacGinit reading score in vocabulary at the second grade level and comprehension at the first grade level. This reading score can make content information difficult for the student to learn/read and for the teacher to teach.

Secondary students must balance the reading demands of each class. Learning disabled students, lower level readers, and second language learners have difficulty with these reading demands. It seems as if there is a widening of the gap in today’s high schools. Some students who are gifted are enrolled in an IB (International Baccalaureate) program. On the other hand, another track of students are learning English via the ESL (English as a Second Language) program. There is no “middle ground.” Students must employ strategies to remember and understand text they read. Teachers can foster literacy engagement by seeing that students feel a sense of ownership in their work.
Peer groups can be successful at the secondary level if devised appropriately. Computer technology meets the needs of Generation X.

There is a lot of content material in World Studies II. Many teachers lecture in order to cover a lot of material faster in nine months. Reading and note taking can be a laborious task for students who are lower level readers, learning disabled, or limited English proficient. How do we get high school students motivated/trained to remember content information? How do teachers teach lower level readers, learning disabled, and/or culturally and linguistically diverse students note-taking and memorization strategies? What can mnemonic strategies/computer technology and text organization tell us about the knowledge, abilities, and potential of bilingual students? If students formulate their own graphic organizers, will they assume ownership by attaching meaning to these “personalized notes?”

From previous literature, contexts in which students perceive that they have autonomy, opportunity for social interaction, and coherence (connections to other learning activities) would be likely to arouse intrinsic motivations such as involvement and curiosity (Ng, Gutrie, Meter, McCann, & Alao, 1998). The full set of motivations that were observed in this study include the following:

- Involvement (being totally absorbed in the task)
- Curiosity (learning content through reading)
- Challenge (figuring out complex tasks)
- Social (interacting with others through reading and writing)
- Emotional tuning (creating good feelings through literacy)
- Compliance (performing reading or writing tasks to meet the demands of the teacher or assignment)
- Recognition (reading or writing to gain tangible rewards such as points)
- Competitiveness (being the best at the literacy task)
- Work-Avoidance (aversion to literacy tasks)
- Self-Efficacy (confidence as a reader and writer)

In order to get students involved in improving literacy skills I have found that motivation is essential. It has been shown that techniques which systematically enhance reading comprehension (e.g., strategy training, visual representations, or organizational cues) and the use of mnemonics (e.g., keyword, pegword, or acoustic representations), prove significant (Forness, Kvale, Bluem, Lloyd, 1997). I often give students notes via graphic organizers. One day, I asked students to get their notes out and tell me what they had learned. I soon realized that adolescents read their notes to me but did not attach any meaning to the task at hand. Students were dependent on the teachers for notes. In essence, the teacher was enabling the students by summarizing all content information. Why should a student have to read if the teacher gives notes/lecture on each chapter? My goal of this project was to teach students how to become independent thinkers versus dependent thinkers. Further, I began to utilize computer technology and graphic organizers in a creative way.
Background

Stuart High School is a small school with approximately 1,380 students. Two-thirds of the students are second language learners from over 70 countries. Fifty percent of the target sample has been identified as LEP (Limited English Proficient). The survey included fifty students at JEB Stuart High School. It was noted that twenty-six percent of the students spoke both their native language as well as English at home. Secondary languages that were spoken included the following: English (74%), Spanish (16%), Arabic (6%), Amharic (Ethiopian, 2%), French (2%), and Portuguese (2%). Many of the students’ parents were born outside the country. The countries included: Guatemala (2%), Peru (2%), Palestine (10%), Nicaragua (4%), US (24%), Bolivia (4%), Ghana (2%), El Salvador (18%), Pakistan (8%), Russia (2%), Vietnam (2%), Ecuador (4%), Korea (2%), Somalia (2%), Hawaii (2%), Ethiopia (2%), Egypt (2%), Brazil (2%), Afghanistan (2%), Cambodia (2%), and Mexico (1%).

Methods

Participants. Fifty students participated in the study. Four classes were included in the study. All students were sophomores. Two classes were team-taught (both a general education and special education teacher present). The other two classes were self-contained. Some students were eliminated from the study due to attendance problems. Twenty-six students were in the computer/graphic organizer intervention classroom in which the instruction focused on student-generated notes. There were 24 students in the comparison group. The assignment of the classrooms to the intervention and comparison conditions were random. In all classrooms Gates-MacGinite reading scores ranged from the second grade level to the tenth grade level. Twenty-three percent of the students received some kinds of special education services in reading, writing, or mathematics. Twenty-two of the students who participated in this study had individual education programs (IEPs) in basic reading skills, written expression, and mathematical calculation. These same students had a deficit area in information processing such as visual motor integration and auditory memory. There were 11 students in the computer/graphic organizer group classroom and 10 in the comparison group. To avoid the confounding effects of irregular attendance, students who missed 3 or more days during this investigation were excluded from the data analysis.

Materials

Computer/graphic organizer group. Lessons from Prentice Hall’s textbook were used as the basis for daily instruction. The industrial revolution was the topic at hand. Students were allowed to construct their own notes. Students worked in groups to complete this task. Students were frequently taken to the computer lab to construct graphic organizers via Microsoft Word.

Comparison group. Lessons from Prentice Hall’s textbook were used as the basis for daily instruction. The industrial revolution was the topic at hand.
Teachers provided notes to all students. Students were not taken to the computer lab.

**Procedures**

*Pre-intervention instruction for all students.* Prior to the intervention, all students in this study were taught how to become active readers. Students were taught the following reading strategy:

R=READ
- Read a paragraph
- Think about the topic and the important details.

C=COVER
- Cover the paragraph with your hand.

R=RECITE
- Tell yourself what you have read
  - Say the topic
  - Say the important details
  - Say it in your own words

C=CHECK
- Lift your hand and check.
- If you forget something that is important, begin again.

A variety of surveys were administered to get background information on all students. The following surveys were administered: background survey (Appendix A), Structured Reading Autobiography (Appendix B), Left/Right Brain Self-Assessment (Appendix C), and Learning Channel Preference Checklist (Appendix D). All students were asked to read a passage on the industrial revolution. Students in the computer/graphic organizer group were asked to divide up into groups of four. Each member of the group was given a specific job. Each group consisted of a speaker, writer, drawer and reader. The teacher was the “time-keeper.” Students were actively engaged with their peers in creating these graphic organizers. Students were less dependent on their teacher for notes. In the comparison group, the teacher produced the notes. Next, the intervention group was taken to the computer lab to construct graphic organizers via Microsoft Word. The comparison group was not taken to the computer lab. At the end of the year, students were asked to take the information from their notes and to type them into a report. All students were asked to either write (comparison group) or type (intervention group) their industrial revolution notes.

**Interactive Strategies**

A student’s knowledge base determines whether or not he or she can access critical thinking skills. In order to promote student thinking at various levels of Bloom’s Taxonomy, the teacher must identify the student’s level of thinking (Knowledge, Comprehension, Application, Analysis, Synthesis, Evaluation). At the time of this project, students studied the Industrial Revolution.
In order to induce a sense of structure (knowledge base), I gave students a list of terms, which should be included in their graphic organizers. An example of a list of terms for the Industrial Revolution is as follows:

**Industrial Revolution**

- Industrial Revolution
- Britain
- Enclosure movement
- Cottage industry
- Factory system
- James Watt
- Henry Bessemer
- Eli Whitney
- Edward Jenner
- Louis Pasteur

The computer/graphic organizer group was given a list of terms before the start of any graphic/group activity. The vocabulary term list gives students a sense of direction. A sample of student’s computerized graphic organizers is as follows:

In comparison to the computerized graphic organizers, I noticed that student’s personalized their hand-drawn computer organizers. Some of the students used colors to shade in the boxes. Some students used various shapes instead of standard square and circle graphic organizers.

At the end of the year, students were asked to pull out these graphic organizers (for each unit) to review for the SOL exams. Students were taken to the computer lab. Students were put into pairs. Students were asked to word process their notes using complete sentences. Students who were poor at typing were paired with a stronger typist. The word processing seemed to increase comprehension. Students had to think about their notes and understand what their notes meant. At the end of the year students were provided with “review notes.” A sample of review notes for the Industrial Revolution is as follows:
**INDUSTRIAL REVOLUTION**

Definition: Change from making products by hand to making them with machines.

**REVOLUTIONARY CHANGES IN THE TEXTILE INDUSTRY**

**COTTAGE INDUSTRY**

- Raw materials (cotton)---peasant families (spun cotton into Thread and wove thread into cloth)
- At home
- Slow production

**MAJOR INVENTIONS**

- Flying shuttle: weave thread into cloth
- Spinning Jenny: spin cotton into thread
- Waterframe: using water to power machines

**THE FIRST FACTORIES**

- Factories were located near rivers (water was a power source)
- Machines were powered by steam engines
- Factories----workers and machines
- Produce large quantities of goods
- Fast production

**INVENTORS AND INVENTIONS**

- James Watt—Steam Engine
- Eli Whitney—Cotton Gin
- Henry Bessemer—Steel
- Edward Jenner---Small pox vaccine
- Louis Pasteur—vaccine against rabies, pasteurization process for milk

In order to increase comprehension, students were asked to type their notes in the computer lab. The following is a sample of a student’s work:

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**Industrial Revolution**

What I learned about the Industrial Revolution is that it means to change from making products by hand to making them with machines. Also, I learned about the revolutionary changes in the textile industry, they had raw materials like cotton. The peasant families spun cotton into thread and wove thread into cloth. They worked on the cotton at home, and had slow production.

The major inventions were the flying shuttle that weaved thread into cloth, the spinning jenny that spun cotton into thread, and the
water-frame that used water to power machines. (Water was the power source). The machines were powered by steam engines and the factories moved away from the rivers. In the factories, they were workers and machines. Also, they produced large quantities of goods, and they had fast production in the factories.

The inventors and their inventions were James Watt, who invented the steam engine, Eli Whitney who invented the cotton gin, Henry Bessemer, who invented steel, Edward Jenner, who invented the small pox machine, and Louis Pasteur who invented the vaccine against milk.

As a follow-up activity to graphic organizers as well as work processing review notes, I have students complete a “guided reading” activity. These questions are based on essential knowledge for the course. It shows the teacher if in fact the student comprehends the information. If the student does not comprehend the information, a review of vocabulary (knowledge) is necessary. At times, when I give students a list of vocabulary I have them complete a chart for their notebooks with the word and definition in their notebooks. This becomes a quick reference guide for students. An example of a vocabulary reference guide is as follows:

**New Vocabulary Words: Industrial Revolution**

<table>
<thead>
<tr>
<th>Vocabulary Word</th>
<th>Definition</th>
<th>Picture</th>
<th>Sentence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industrial Revolution</td>
<td>Change from making products by hand to making them with machines.</td>
<td><img src="image.png" alt="Hand Picture" /></td>
<td>The Industrial Revolution was a change from making products by hand to making them with machines. The process was faster.</td>
</tr>
</tbody>
</table>
Reflections

When I taught the active reading strategy, I began to realize that my students would need a way to remember “RCRC.” Many high school students enjoy learning about their teachers. For instance, I realized that many of my students liked or had a dog. I told my students that I had adopted a new dog. They knew that the dog’s name was Rex. Some of my most non-academic students continued to ask me about my dog instead of any WSII content. These adolescents seemed so motivated by my dog, and the rap songs that a particular student Calvin continued to sing. When I taught the active reading strategy I brought in a picture of my dog. At the top of the picture (visual) of Rex, I wrote “Rex, Calvin, Rex, Calvin.” This story assisted the students with a memory trick to learn the reading strategy.

Adolescents love stories, especially if the story has something to do with topics outside of the content being taught. LD subjects can improve performance when instructed to use organization (Dallago & Moelyy, 1980; Worden, 1983) or mnemonic systems like the keyword method (Scruggs, Mastropieri, Levin & Geoffrey, 1985). A central challenge in remediating memory deficits in at-risk groups such as LD students, lies in engineering the encoding context so that it induces such students to engage in mnemonically effective control processes. One way to do this consists of developing pictorial adjuncts (e.g. Mastropieri and Scruggs, 1989) or other text manipulations that require and invite mnemonically effective controlled processing of the target material (McDaniel, Einstein, Waddill, 1990).

Adolescents love to be active. Many have trouble sitting for the period of one block (90 minutes). Computer technology allows students to be interactive. This new relation between student and computer-based text recalls Alvin Toffler’s theory of the “prosumer,” the person who uses information-age technology to combine the roles of producer and consumer (Schwartz, 1988). Software programs allow teachers to integrate the learning and application of text structures in ways that encourage students to become readers and writers. Their environment motivated the computer lab/graphic organizer group.

Graphic organizers give students a concrete way to learn new information. It helps them to organize information. Webbing (similar to concept mapping and semantic mapping) functions in what Boyle and Perego (1990) refer to as literacy scaffold, a framework that helps students access “the meanings and pleasure of print and provides multiple cues that they can use to construct meaning.” Secondary students enjoy drawing and interacting with their peers. Teenagers love to socialize. The “multi-lingual” student body at Stuart High School speaks many languages. The following components of a theme cycle in multilingual must be considered: The Learning Issue (topic negotiating, webbing or prior knowledge, posing questions), Planning Collaboratively (brainstorming, identifying learning experiences, organizing student and teacher responsibility, gathering materials and planning, Literacy Events (exploring the issue in greater depth, engaging in authentic reading and writing, working with community resource people and materials, sharing means, new ideas, and new questions), and Assessing Progress (presenting understanding and new questions,
reviewing initial intentions, discussing learning alternatives, creating new approaches for mutual access, identifying new goals).

Students were surprised and challenged when I asked them to be the “teacher” by devising their own notes. Prentice Hall has available student tutorials which stimulate the learning process. Furthermore, when students' word-process their notes, they comprehend their notes. Instead of “copying” their notes from the teacher, they are using this information in an “engaging” manner for meaning. The emergence of simple-to-use “point and click” computer capabilities has created new forms of cultural-linguistic and institutional capital that are potential tools for promoting literacy acquisition among non-English background immigrants (Duran, 1996). Literacy continues to be of growing concern at the secondary level. When dealing with secondary students we must remember Shor’s (1992) message:

People begin life as motivated learns, not as passive beings. Children naturally join the world around them. They learn by interacting, by experimenting, and by using play to internalize the meaning of words and experience. Language intrigues children; they have needs they want met. But year by year their dynamic learning erodes in passive classrooms not organized around their cultural backgrounds, conditions, or interests. Their curiosity and social instincts decline…(Shor, 1992, pg. 17)
References


*Appendices available upon request.*