The Effectiveness of Using Guided Notes
In a High School Physics Classroom

By

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Abstract

Organization of information is an important skill that students must learn. There are many different ways to achieve this goal with varying degrees of difficulty. One such method is using guided notes to model how to organize information. Guided notes are notes that the instructor gives to the students with key information missing in them. The instructor then teaches what the missing information is while stressing the importance of the idea.

There has been research done looking at guided notes and their effectiveness. The research has shown a positive improvement with student academics and behavior in the classroom. Although much of the literature on this topic is dated and done at the college level, it still applies to students in the classroom.

Four different sections of General Physics in a high school were tracked and compared over a period of time. In groups of two, the sections used guided notes and completed notes and assessments were taken throughout the process. This research supported that students perform better academically when using guided notes.
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The Effects of Guided Notes in a High School Physics Classroom

All students have to acquire the ability to take effective notes in order to achieve good results in high school and in higher learning institutes. There is no formal class, curriculum, or method that is taught in any level of education where a student would be given the skills to directly apply them to any subject. It is important to teach students the proper method of note taking, but doing so can be a difficult process.

Using guided notes is one method for teaching students how to take notes effectively and thereby improve learning. This study examined the effectiveness of the guided note process. The literature has shown that students perform better academically when guided notes are used at the college level. There have been a few studies to show the effects in secondary classrooms but those studies were conducted in special situations with students in prisons, juvenile delinquents in detention programs, special education classrooms and students with learning disabilities.

This study was conducted to determine if guided notes are as effective with regular education students as they have been in special circumstances. Particularly, the study compared how effective guided notes were in a public high school Physics classroom.
Guided Notes

Literature Review

Taking effective notes in the classroom is a much more complicated task than it sounds. It requires a student to: sustain attention, comprehend what the teacher is stating, decide between what information is important or irrelevant, paraphrase the information into a note format, organize it in a coherent way, and record it legibly and quickly. One of the most effective methods to help students with this process of taking notes is by using guided notes.

Utilizing guided notes helps students to organize lecture content and provides opportunities to actively respond to material presented in class, which in turn positively affects academic achievement. The effects of guided notes on academic behavior have been demonstrated convincingly in several studies. Hamilton, Seibert, Gardner, and Talbert-Johnson (2000) found that using guided notes improved academic performance. Sweeney, Gardner, Jones, Greenfield, and Frialey (1999) demonstrated that guided notes were also effective in improving the quiz scores and accuracy of notes taken by high school students. Lazarus (1991) found that the achievement of high school students was higher when guided notes were used. In another study, Lazarus (1993) also demonstrated that guided notes were beneficial in increasing academic achievement of college-level students.

It should be noted that most current studies provided in this review are linked to the studies done by Lazarus (1991). Although classroom dynamics and teaching philosophies have changed since Lazarus conducted his study, current research still refers to the relevancy of his findings.
This literature review covers lectures, when they are used, the definition of guided notes, and the process of note taking. It also includes how to prepare students for class, what to do during class and what to do after the class is over. The literature concludes with both benefits and disadvantages of guided notes.

*Lectures*

For decades, professors have used lectures as the preferred way to teach (Lord, 2008). Students in secondary schools and in particular college must be able to learn and take notes from lectures because this method has been a major method of instruction (Musti-Roa, Kroeger & Schumacher-Dyke, 2008). Putnam, Deshler, and Schumaker (1993) interviewed 120 teachers of whom half taught seventh grade students and half taught tenth grade students. These teachers taught in eight school districts in three different states and reported spending approximately half of their class periods lecturing, with tenth grade teachers lecturing slightly more than seventh grade teachers. Anderson and Armbruster (1986) found that in college, students spent 80% of class time listening to lectures. Results showed that the traditional lecture delivery system have the highest grade point average and one of the lowest failing rates of all teaching strategies (Wynegar & Fenster, 2009). Since lecture remains prevalent as a method of instruction, teaching students to learn from them is critical to academic success.

Typically, course content in most secondary classrooms was instructed through readings, discussions, and lectures (Horton, Lovitt, & Christensen, 1991; Saski, Swicegood, & Carter, 1983). Depending on the classroom, certain technologies were used to convey the lecture but the common theme was that the instructor gave the information to the student and the student took the information in the form of notes. This
information exchange has been done in several different methods. The instructor placed
the notes on an overhead and the student copied them down; the instructor handouts the
notes and then reviews them, or a combination of the two where students fill in key
information on a handout provided by the instructor, which are called guided notes.

Definition of Guided Notes

Developed by Lazarus (1998, 1991), guided notes are a skeleton outline of the
main ideas and related concepts of a presentation with spaces for students to insert
supporting information. This guide includes key vocabulary, related issues, and
contrasting views. Guides include less information for more skilled students or more
information for less skilled students. While lecturing, the teacher uses a completed guided
notes overhead transparency or Power Point presentation so that students can see as well
as hear and write the important notes (Gore, 2004).

Guided notes are intended to help students organize content and provide
opportunities to actively respond to material presented in class, which in turn positively
affects academic achievement. The effects of guided notes on academic behavior have
demonstrated good results in several studies. Hamilton, Seibert, Gardner, and Talbert-
Johnson (2000) found that using guided notes during whole-group-instruction with
juvenile delinquents improved academic performance.

Note Taking

Besides guided notes there were two other methods that students used. The first
type is when the student attempts to write down everything the instructor states or writes.
There is a great deal of evidence on the effects of hand written notes and student
performance. The second type of note taking is to simply not take notes or periodically
write something down on a piece of paper. In this second case there was no research that was located to support any research. It can be assumed that in most cases the students that do not write any notes down will perform poorly on any assessment done on a topic. It is possibly that there are reasons behind the lack of note taking but at this time the research only discusses students that attempt to take notes.

Despite evidence that secondary students who record notes perform better on recall measures and tests (Barnett, 2003; DiVesta & Gray, 1973; Kiewra, 1985), most students are not explicitly taught how to record notes. Few, if any, students are given instruction on note-taking techniques and effective note-taking skills to enhance their own learning (Suritsky & Hughes, 1996). In addition, the classroom environment or lecture may not prompt students to record and produce complete notes (Austin, Lee & Carr, 2004). These findings are troubling because research has shown that notes serve as the primary means of capturing content (Suritsky & Hughes, 1991) and that content is directly linked to teacher-made tests, which often compose half of the student’s grade (Putnam, Deshler & Schumaker, 1993). Those students who are effective note takers or who are trained in note taking will more likely perform better on classroom tests than those students not trained or those students who used conventional note taking (Boyle, 1996; Boyle & Weishaar, 2001; Horton, Lovitt & Christensen, 1991; Lazarus, 1991; Saksi, Swicegood & Carter, 1983).

The Process of Note Taking

The note-taking process is a complex set of tasks. Note taking can be quite challenging for most students because it involves using listening, processing, and writing skills simultaneously or shifting back and forth between these skills. For many students
note taking can become overwhelming (Rowe, 1976). When Suritsky (1992) interviewed students about their note-taking skills, she found multiple problems. In her study, these students reported that they had difficulty deciding which important lecture points to record, recording notes quickly enough to keep up with the teacher, and maintaining attention to the lecture. These problems come as no surprise and illustrate the point that students should be given explicit training in note taking to learn these skills and strategies and practice to integrate the coordination of these skills. Note taking is viewed as a process that begins prior to the lecture and ends after students review their notes. Understanding this process can help teachers and parents better prepare students for note taking.

*Preparing Students to Learn*

Prior to the start of class, students should prepare to learn. As they enter the classroom, they should find a seat with a good view of the teacher and blackboard. If they have visual problems or difficulty copying information off the board or overhead, they should sit close to the front of the room. As they prepare to record notes, they should mark the current date and the topic of discussion on the page. Noting the date and topic are key aspects of preparation because they will help students locate information more easily. If time permits, students may want to jot down information about the topic to activate prior knowledge. For some students, the topic itself stimulates thoughts and memories. For example, if the topic is frogs, many students have already begun recalling thoughts from prior knowledge and their experiences, good and bad, with frogs. Whether they are thinking about the frog they caught at camp or the one they recently dissected in science class, because their thoughts are on the current topic, these ideas will personalize
their notes for the day. Finally, part of the preparation process involves making sure that students have sufficient writing utensils and paper available so that they do not have to interrupt learning by searching for more.

*During the Class*

Once the class begins, students must use listening skills to attend to the important points of the lecture and then relate, or assign meaning, to them (Kiewra, 1985; Suritsky & Hughes, 1996). By assigning meaning, students have to initially concentrate on and understand the main points of the lecture. Focus on both the teacher and topic is a key aspect of the listening process and involves using selective attention to receive the visual (the teacher and the notes on board or overhead) and auditory cues (the teacher’s voice). Attention to the teacher allows the student to listen to relevant lecture points. Moreover, by having students add details as they record notes, the content becomes more meaningful to them (Kiewra, 1985). Those notes must be meaningful and understandable for students to effectively review them for an upcoming test or quiz. If not, they will have to spend additional time refining the notes through clarification, organization, or elaboration. More about this topic is in the following review stage of note taking.

As students hear information, they begin to process the information to make it understandable and personalized. Paraphrasing is the most common method of personalization, whereby students record lecture notes in their own words (Suritsky and Hughes, 1991). This technique involves using an abbreviation method that can help them record more complete notes (Hughes & Suritsky, 1994). However, some students frequently use other deeper processing techniques (Bretzing & Kulhavy, 1979) to help them understand content or concepts, including elaboration and relating new information
with prior knowledge (Craik & Lockhart, 1972). Students should not try to record notes verbatim because this method is the least effective and most detrimental to learning (Hughes & Suritsky, 1994). Instead, the key to becoming an effective note taker involves recording important lecture points in an organized manner as completely as possible (Kiewra, 1985).

Cognitive processing of the information begins prior to the actual lecture as students set up and prepare to take notes. In most cases, they have already begun thinking about the topic. Cognitive processing involves distinguishing between essential and nonessential lecture information, determining foreign terms or unknown vocabulary, storing bits of lecture information in short-term memory long enough to accurately record it, and paraphrasing and elaborating on the main points (Kiewra et al., 1991). For many students, difficulty with any of these steps results in fewer or less complete lecture points recorded (Aiken, Thomas & Shennum, 1975). The ability to pick and choose only the important ideas, and then supplement them with details, is one key to processing notes efficiently (Kiewra, 1985). For many students, determining these points is one of the most difficult aspects of the note-taking process (Suritsky, 1992); however, teachers can improve this area by using cued lecture points also called guided notes. This technique is effective because students are more likely to record cued points than non-cued points (Hughes & Suritsky, 1994).

As students process the information from the class, they must also accurately record it. Writing notes involves recording information in a succinct, yet usable format. When notes are too sparse, the information may not be understandable later: if they have too much detail, the student may miss other relevant lecture points because they are too
busy recording previous information. Recording important lecture points at a reasonably fast rate to keep up with the lecturer is key (Kiewra, 1985). Using shorthand or abbreviations is a plus to recording notes efficiently, as is organization.

After the Lecture

The last step in the note-taking process, which is often overlooked, is a review of notes after the lecture. The review process is important, whether it occurs immediately after class or when studying notes for a test (Lazarus, 1991; Suritsky & Hughes, 1996). However, for some students, this task can have pitfalls. Research has shown that some students are not aware that they should review notes; others are aware but simply do not review their notes (Suritsky & Hughes, 1996). Reviewing notes often means looking over them immediately after class to fill in gaps, clarify poorly understood concepts, or correct spelling and handwriting legibility. For many students, reviewing notes is often the step missing from their note-taking repertoire. Yet, this step could allow poor note takers to compensate for their inadequacies (Suritsky & Hughes, 1996). The key during this step is to review notes immediately after class. The topic is still fresh and the review then becomes part of a routine for students. For example, students could compare their notes to fill in the gaps and complete various lecture points. They could also use their textbook to elaborate or expand class information. In doing so, students can add examples from the textbook to concepts in their notes. This technique will also enhance their understanding of the information they read in the textbook. In other cases, they could use a review activity that links parts of notes to headings (Porte, 2001).
Summary of Note Taking

There are several keys to multitasking during the note-taking process. Initially, students should prepare by locating a seat where they can see the board and teacher and recording the date and topic on their notes. During the listening stage, they should focus on the topic and be given cued lecture points or other attention-getting techniques such as questioning to help them maintain this attention. During the cognitive process stage, students should record relevant information and then add details to personalize the content. Being able to recognize the instructor’s cues is an important skill for students trying to determine relevant lecture points. These cues vary from teacher to teacher and may be the reason why some students take better notes in certain classes. During note taking, students should be able to write the relevant lecture points at a sufficiently fast pace and in an organized manner. If the information is initially presented in an organized manner, they can simply record the notes in a chronological or hierarchical order. Finally, immediately after the lecture, students should review their notes for gaps or areas of misunderstanding. If teachers allot five minutes for this task prior to the end of class, it could become part of a daily routine.

Note Taking and Learning

Two complementary reasons explain the success of note taking as a learning strategy. First, notes provide students with an external storage mechanism for information (Rickards & Friedman, 1978). The process of note taking also helps students encode information into memory because students must pay attention to, organize, and interpret lecture information (Bretzing & Kulhavy, 1979). The encoding function of note taking is particularly relevant to the current study. If teachers’ communication behaviors are
related to student learning, we would expect clear differences in the notes taken by students based on the communication behaviors of the teacher. In short, notes taken by students can provide a unique way of determining how students encode lecture information and, consequently, can provide a new approach for assessing the relationship between teacher communication behaviors and student learning. For this approach to be valid, however, a relationship must exist between note taking effectiveness and learning outcomes.

Note taking has consistently been identified as the most important learning strategy available to students in lecture situations (Musti-Roa, Kroeger & Schumacher-Dyke, 2008; Kiewra, 1984). Fisher and Harris (1973) explored the relationship between note taking and recall and found a correlation, which students who were able to take accurate notes scored better on test. Titsworth and Kiewra (2004, 1998) added new information to this research when they distinguished between organizational points and details recorded in students’ notes. Organizational points were defined as structural elements (e.g., advance organizers, main and subordinate ideas, etc.) which were recorded in student notes. For example, students might record the main ideas covered in a lecture as well as corresponding subtopics that elaborate main ideas. Noted organizational points are contrasted from noted details, which are specific definitions, explanations, or examples provided by the lecturer. The study predicted that the positive effects of note taking on achievement and was able to be replicated, thus providing evidence of validity for using note taking to assess learning.
Benefits of Guided Notes

Guided notes are modified versions of the instructor’s notes or slides that require students to fill in missing information as the lecture progresses. These notes give specific prompts as to when and where students should record key points from a lecture, thus providing an effective model for evoking desired knowledge (Austin, Lee, & Carr, 2004). Guided notes also provide opportunities to actively respond to material presented in class (Heward, 1994), which in turn positively affects academic achievement.

The effects of guided notes on academic behavior have been demonstrated positively in several studies. Hamilton, Seibertm Gardner, and Talbert-Johnson (2000) found that using guided notes during whole-group instruction improved academic performance of incarcerated juveniles (ages 13-18) in a detention center. Sweeney, Ehrhardt, Gardner, Jones, Greenfield, and Fribley (1999) showed that guided notes were effective in improving the quiz scores and accuracy of notes taken by academically at-risk high school students. Similarly, Lazarus (1991, 1993) found that the achievement of high school students with learning disabilities was higher when guided notes were used. Lazarus (1993) also demonstrated that guided notes were beneficial in increasing academic achievement of college-level students with learning disabilities.

According to Barbetta and Skaruppa (1995), guided notes have a number of advantages relative to student produced note taking. These include reduction in errors associated with determining what to write, minimal writing requirements to allow more opportunities to listen and participate, the provision of a standard set of notes for test preparation, and requirements for active student responding in completing the notes.
Causes

Barbetta and Skaruppa (1995) stated that students’ note taking inadequacies might be caused by the difficulties encountered when students are required to listen to a lecture and simultaneously take notes. When students are required to engage in the dual tasks of listening and writing, deficiencies in one or more behaviors could potentially result. A focus on accuracy in recording information might limit opportunities to participate in class and could hinder a student’s ability to engage in covert verbal behavior (i.e., thinking) about information presented during the lecture. A student’s focus on note taking might also limit his participation in other opportunities for learning, such as asking and answering questions or actively generating original ideas about the material. Similarly, a focus on listening and participating in class discussions could have adverse effect on the accuracy and completeness of student’s notes by limiting opportunities for recording information.

In traditional instructional formats, every student is expected to progress at essentially the same rate. The instructor exposes all students to the same materials at the same pace, and students are test at the same time. Unfortunately, all students do not learn at the same pace. Some students may have mastered one unit of material and are ready to move to the next; others may have required additional instruction and practice to achieve mastery. When course content is cumulative, students who fail to master one unit will lack the prerequisite skills to begin the next. A student who falls behind in the beginning of the year is more likely to fail the course (Tincani, 2004).
Guidelines

Barbetta and Skaruppa (1995) suggested some guidelines for constructing guided notes: 1. Use a standard outline format; 2. Provide consistent cues (for example bullets, asterisks, or blank lines) so that students know where to write; 3. Make sure students have ample room to write; 4. Do not require students to write down too much; it can slow down the lecture; 5. Add appendices with additional course materials and information; 6. Have guided notes available on the Web for students to download; 7. Include additional in-class activities and homework exercises; 8. Supplement lectures with overhead transparencies with key points for students to write. With these eight steps any instructor could provide effective guided notes in their classroom.

Downfalls of Guided Notes

Guided notes have demonstrated that they can be an effective tool in both the secondary and college level classroom. There are three main downfalls to the use of guided notes: the first is that instructors not utilizing or understanding the concept of what guided notes are; the second is that students and instructors become overly comfortable with guided note; and third, as a result guided notes become a crutch so that the student feels they always must use them (Barnes, 2006).

Utilizing or Understanding

Although Barbetta and Skaruppa’s (1995) wrote out the eight steps to follow and Lazarus (1993) detailed exactly what guided notes should be many instructors do not follow these guidelines. In most classrooms in secondary education Guided Notes are not being used. Limited research exists for Baretta and Skaruppa’s (1995) use of Guided Notes with students (Austin, Lee, Thibeault, Carr, & Bailey, 2002). There is a
discrepancy as to what is perceived to be guide notes and the true definition. With readily available software presentation programs and projection facilities, instructors have the ability to easily provide extensive handouts for students. Furthermore, the posting of handouts on-line utilizing course management systems has become, in many cases, a standard expectation by students (Brazeau, 2006). These handouts are full of detail and in many cases are the actual slides that are presented in the lecture. The essential problem is that active learning is diminished when students are provided all the information and not directly involved in the process of identifying, collecting, and organizing the information through the process of note taking.

Comfortable

When an instructor continuously uses any method of instruction both the instructor and the students become comfortable with the method. In many cases this is beneficial because the instructor is modeling or developing a skill the student will use in the classroom but might need in their everyday lives. For many instructors the use of PowerPoint for presentation of material is very common (Brazeau, 2006). PowerPoint presentations can enhance and stimulate the learning environment by providing structure and organization, flexibility (linked materials), and the ability to mix various media to accommodate different leaning strategies. The problem is that instructors and students can lose this focus and view the notes as easy. The instructor has to work very little on the presentation once it is complete. The student eventually comes to expect the presentation and not focus on the topic being presented.
Crutch

There has been little evidence to prove that guide notes can become a crutch, but it can be possible (Barnes, 2006). The concept is that if the student is always being provided with some of the information, the student will never actually learn the steps to take notes themselves. The key is to wean the students off the instructor always providing the information as their abilities to take effective notes increase. The goal of students that receive guided notes is not to make school easy, but to help them learn as much as possible. If a student becomes totally dependant on the guided notes then they may never learn the very skill that guided notes are intended to demonstrate. Guided notes are suppose to provide students the correct method of how to logically, coherently, and quickly process information that is being presented.

Lack of Research

All of the research that was done in the secondary level involved students with some form of disability (either physical or mental) in a social studies classroom. Students with mild disabilities often have difficulty meeting the increased curriculum demands in secondary content-area classes, particularly in social studies (Deshler, D., Schumaker, J., Lenz, K., Bulgren, J., Hock, M., Knight, J., & Ehren, B., 2001), where textbook reading levels often exceed those of students with disabilities (Mastropieri, Scruggs, & Graetz, 2003). Many students lack adequate academic skills to read grade-level texts and have not developed sufficient study and organization skills to compensate for such deficits (Mastropieri, Scruggs, Spence; & Fontana, 2003). In addition, these students commonly exhibit difficulty with reading comprehension, especially with identifying the main ideas and supporting details from the textbook (Jitendra, Hoppes, & Xin, 2000). Moreover,
students with mild disabilities often have insufficient prior knowledge and lack specific strategies to comprehend content-area information (Lederei, 2000). In spite of these difficulties, textbooks are the primary means to convey content-area information to students in social studies classrooms (Harniss, Dickson, Kinde; & Hollenbeck, 2001) and have been criticized for a multitude of reasons over the years (Paxton, 1999).

There were many more studies done in the college levels but secondary school and college are different in many ways and again the research leaned more toward disabled students.

The largest problem is that in all of the research discussed the importance of having students taking effective notes but there was not a simple set of steps to follow. For such an important topic in a student’s academic career there few studies demonstrating what the most effective method to take notes is. Since college is mostly lecture based (Musti-Roa, Kroeger & Schumacher-Dyke, 2008) and secondary school still use lectures, there needs to be more research done on the benefits of guided notes and how they effect all secondary education students.

Summary

Guided notes have shown that they are effective in a multitude of situations. They have also demonstrated that they are highly effective with certain groups of students, particularly disabled or troubled. There have been numerous studies on the effects of guided notes with the disabled in both the secondary classroom as well as the college level. However, more studies need to be performed to collect data on the effectiveness of guided notes on regular educated students.
Guided notes allow the student and instructor to understand and demonstrate what is required or important. They provide a model of the correct and appropriate way to think and in turn how to act. Research has shown that with increased scholastic abilities students unwanted behavior decreases.
Method

The objective of this study was to determine the effectiveness of guided notes in a physics classroom. This was accomplished by looking at two different groups over a two week period. The first group received guided notes while the second group received completed notes. During the second week the second group received guided notes while the first received completed notes. Three quizzes were given in each week and the results were compared to one another.

Participants

Eighty-two high school students in General Physics participated in the study. The students’ ages ranged from 16 to 19 years old and were in 10th, 11th and 12th grade. The majority of students were in their senior year. There were three students classified as sophomores but two of the three had not received enough credits to be considered in the normal grade level that their age would indicate.

Most of the students came from low-income, inner city neighborhoods. The ethnicity of the participants included minorities: African American, Asian, and Hispanic. Out of the 82 participates, 56 were female and 26 were males. There were four different sections of General Physics that met throughout the school day. Two sections meet in the morning and two in the afternoon. To alleviate the time difference as a variable, one section from the morning and one section in the afternoon was used in each trial. Classes met five days a week for an average of 40 minutes per class. The study was conducted during weekly class sessions, during a two week period.

The students attendance had an effect on the actual number of participates. On average there were 10 to 15 students missing every day. The reasons for this lapse of
attending ranged from skipping class to not coming to school. This is a common problem found in the city schools. Compared to other high schools this particular magnet school has a higher achievement rate then its counterparts. The average graduation rate is at 64%; where as the city in general has a graduation rate of 32%. Another major difference is that students in this particular school all have to take four years of math and science in order to graduate, where as other schools only require two or three years.

Setting

The classroom was located on the third floor of school that was built in the early 1900’s. The room was full of black slate work benches that allow two students to sit next to each other. The benches were facing the blackboard, overhead projector, and the Smart Board. The room was typically hotter in temperature than the rest of the school, which students frequently commented on. Depending on the temperature some students had a difficult focusing on the lesson. The room had four sets of windows in the rear of the room that started about three feet off the floor and stretched to the ceiling. The room was bright and had many objects hanging on the walls. There was seven computers that were placed around the outside perimeter of the room. This particular room is smaller than the other two physics rooms in the building. The room does not have the space to have a separate work area or a place to conduct experiments.

Procedure and Materials

During sessions, the instructor delivered a lecture with PowerPoint slides that supplemented the reading assignments. The first slide stated the objectives for the session. The second slide presented a question or problem that introduced the topic. The next set of slides presented material pertaining to the question or problem and addressed
each of the objectives sequentially with definitions, explanations, examples, demonstrations, and questions. The final set of slides contained review questions corresponding to each objective to assess understanding of the material that had been presented. Completed notes were identical to the slides in the presentation for the class.

Guided notes differed from completed notes by having students’ complete important information in their own writing. Blanks were left to indicate where the important information was located and with the guidance of the instructor what information was required. The students were allowed to interact and question while the information was provided. Students were allowed to use their notes either guided or completed, on any quiz that was given.

Class time

Students were given the notes for the day’s instruction immediately after the daily quiz was completed and corrected. Not every class was set up with completed and guided notes. There were other days that consisted of activities and labs. These activities and labs helped to bring a deeper understanding of the knowledge that was being taught. The activities were used as a hands-on method of learning to assist students with Physics concepts.

Quizzes

A five point post-class quiz pertaining to material from the previous day’s class was administered during the first 10 minutes of each class session. One point was allocated for each correct answer to a question, or part of a question when the question called for more than one discrete response. Pre-class quizzes that contained different but equivalent questions were administered separately before the delivery of new material.
Although pre-class quizzes also contained questions for five points, students were informed that they would not be penalized for incorrect answers, and errors would not affect their grade. Pre- and post-class quizzes were counterbalanced across the four sections the pre-class quiz questions for one section were used as the post-class quiz questions for the other section. If a student missed a class, his or her quiz score for that class was deleted from the analysis.

All quiz questions required short answers and were directly related to the objectives specified for the class. Across all of the quizzes, 20% of the total points were for knowledge-level questions that required students only to repeat information that had been presented. Twenty percent of the total points were for comprehension-level questions that involved stating an original example of a concept, stating the concept represented in an example, or explaining a concept in the student’s own words (e.g. “give an example of Newton’s Third Law”). Twenty percent of the points were derived from application-level questions that required the use of a formula, method, rule or principle to solve a novel problem (e.g. “calculate what the force of 10 kg block accelerating at 2 m/s²”). Twenty percent of the points were for analysis-level questions that require multiple steps to determine and answer to a question. The final 20% was used to have students interpret or draw a graphical analysis of information that was given to them (e.g. “What does the graph of increasing distance verses time look like?”). Vargas (1972) described this type of questioning and is linked to Bloom’s taxonomy (2001, 1956).

Once the quiz was complete the papers were collected and then redistributed for students to grade. The students were questioned as to what the correct answers were and the class decided what the correct answer was actually supposed to be. Both the
completed notes and guided notes were allowed to be used during the quizzes. Students were allowed to only use their notes and not share or discuss the notes during the quiz.

**Control**

There were four separate sections, Period three, five, six, and nine, that were used to collect data for two weeks. Period three and six and Period five and nine were grouped together to combine one morning section and one afternoon section. These two groups were classified as group A and B, respectively. During week one, group A was given guided notes while group B were given completed notes. During week two, group B was given completed notes and group A were given guided notes.

Notes were evaluated on two separate scales depending on the type of notes that they were. Guided notes were evaluated on the basis of completeness and accuracy. Students were given points if they had completed all notes and for each missing note points were lost. The accuracy of the notes was compared to the completed notes to verify what information was given. Points were lost for every inaccurate note written down. Extra points were given if the student placed correct additional notes that were not explicitly told to write down. These extra notes would be classified as anything the instructor spoke about or any note the student used to better understand the idea. Completed notes were evaluated as to whether they were kept organized and easily accessible. Students were asked to retrieve their notes and present them to the instructor to verify if the students were able to be presented successfully. Students that were unable to locate their notes in a timely manner or had to search in a mess of papers lost points.

Quizzes were the most looked at portion of this study, since they provided information on students understanding quickly. The format and grading was outlined
previously. Students took a quiz on the information almost daily so that enough data could be collected.

Homework was assigned three days out of the week, for both weeks, to give students more practice on the concept and ideas presented in the notes. Students were evaluated on the correctness and completeness. Students were given 10 problems per homework assignment and graded on if the questions were completed, answered correctly, and the method of solving the problem was indicated. The homework was set up in the manner of the final exam, where part of the homework had multiple choice questions and show the work fill in questions. There were five to six multiple choice questions worth one point. The remaining four to five fill in and show work questions were worth four points each. The first point was awarded if the correct formula was provided and the correct variables were placed in the formula, the second point came if there was either a list of the variables with units or if the units had been placed into the formula, and the third and fourth point was given if the correct answer and units were given.

Lab activities were used to enhance the information given in class. This allowed students to manipulate and observe the concept being taught. This provided an interaction with different materials and caused students to make connections as to what they were being shown. Labs were evaluated on students understanding of the concept and completeness of the data. Labs were directed primarily to focus on taking data and understanding how to graph the information. Understanding graphs is an important concept in physics.
All four points were compared to each other to verify the accuracy and effectiveness of the notes. In each different category the different classes were compared to each other. The class scores were compared to each other when the students used completed notes as well as when students used guided notes. After similar notes were compared the two different notes were compared to each other. This was done to verify if the same types of notes would yield the same results and if there was a distinct advantage of one type of note over the other. Quizzes were looked at most heavily since more students actively participated in this form of research.

*Social Validity*

Students were asked to anonymously complete a questionnaire at the end of the two week period. Students were asked to circle the number on a five-point scale indicating the extent to which each of the note formats helped the student (a) to follow the class, (b) to study and review the material, and (c) to learn to take their own notes more effectively. Students were also asked to rate the extent to which they supplemented each type of notes with their own notes, and the type of notes they preferred.
Results

This study evaluated the effects of guided notes on four different classes of general physics. The four classes met throughout the day, two were in the morning and two in the afternoon. In order to substantiate the findings two groups were formed, taking the data from one class in the morning and one class in the afternoon.

The method that was chosen to compare how effective guided notes were used was by having one group use guided notes for a week while the second group used completed notes. During the second week, the two groups switched, whereby the classes that had used guided notes the first week received completed notes, and the completed note classes received guided notes. Guided notes are notes where key information is missing or left out so that the student is required to it in. Completed notes are notes that all the information is provided.

For both groups, the notes were written and presented in the identical setting except that the guided notes were missing key information. Each group was given three quizzes on the material presented in the notes each week. The quizzes that were given to each group were identical in every manner. Students were allowed to use their own notes on the quizzes. They were not allowed to share notes or discuss the answers during the quiz.

Scores

In the overall scores, there was a slight increase in quiz scores when students used guided notes versus completed notes. During week one guided notes scored an overall score of 86% correct, where as completed notes scored an 84%. In week two guided notes scored an overall of 88%, where as completed notes scored an 83%. The quiz data
was placed into a spread sheet and the average grades in each period were compared to each other. This data can be viewed in table 1 and table 2. The quizzes were based on a five point system with different questions based on the material discussed the day before.
Table 1

**Week 1**

- *Group A received guided notes*

- *Group B received completed notes*

<table>
<thead>
<tr>
<th>Group</th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Period</td>
<td>3</td>
<td>6</td>
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<tr>
<td>Overall score (%)</td>
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<td>85.55</td>
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<td>(Three Quizzes)</td>
<td></td>
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<tr>
<td>Combined score (%)</td>
<td>86</td>
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</tbody>
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Table 2

**Week 2**

- *Group A received completed notes*

- *Group B received guided notes*

<table>
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<tr>
<th>Group</th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Period</td>
<td>3</td>
<td>6</td>
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<tr>
<td>Overall score (%)</td>
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<tr>
<td>(Three Quizzes)</td>
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<tr>
<td>Combined score (%)</td>
<td>83</td>
<td></td>
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</table>
Week 1

During week one, group A, was given guided notes. The students’ reaction to guided notes was mixed. Some students liked the idea while others did not. Many students were not familiar with them or simply called them ‘fill in the blank’. Over the course of the week students began to enjoy the notes and see the value in them. Quiz scores went up as the week progressed and students became more familiar with them.

There was also a noticeable difference in students’ behaviors as the week progressed. Students became more involved and demonstrated more interest in the information. There were fewer distractions in the class, including students, singing, talking, and attempting to sleep. Students wanted to take the notes so that they could do well on the quizzes.

With the group B, completed notes were given to the students. Most of the students found this method uneventful or boring. As the week continued students grades stayed fairly consistent with little change in the students’ grades overall.

Their behavior as the week went on became less and less involved. There were many more distractions than the first group was experiencing. In both classes, there were several students that attempted to fall asleep or have their own discussions while the teacher was speaking. There were some male students that felt the need to get up and walk around to stay involved. This may have been directly related to the lecture format.

Week 2

During the second week, group A was given completed notes while group B received the guided notes. Much like group B the first week, the students’ grades on the
quizzes remained consistent throughout the week. There grades dropped a few percentage points compared to when guided notes were used.

Near the beginning of the week, students liked the idea of not having to write down the information but as time went on students’ behaviors began to become more distractive. Talking and attempting to sleep became more common. There was less interaction and students had a difficult time focusing.

Group B began the guided notes and there was a definite change in attitude from the previous week. Students began to act similar to the group A had the first week. The test scores improved as the week went on and students became focused and interested. There were less distractions and more involvement causing students to perform better.

The use of guided notes had a positive effect on students’ attitudes and behaviors when used. Since behaviors improved academic performance was able to improve, although the grade change was not drastic, it showed improvement. Students demonstrated that writing the important information down, using guided notes, assisted them with improving their academic scores.
Guided Notes have been shown to have a positive effect on classroom performance. Guided notes are a set of notes that are missing vital information that the student needs to fill in. In this study they showed when used there was a slight improvement in quiz scores. Student behaviors improved in both groups when guided notes were given. Two groups of classes were compared to see how effective guided notes were in academic performance. Over a two week period two different groups were given either guided notes or completed notes. After one week the two groups changed which one had guided notes or completed notes.

Discussion

One possible explanation for the lack of notable differences between the effect of guided notes and completed note taking on quiz scores which was also reported by Neef et al. (2006), was the inclusion of multiple instructional strategies. As recommended by Kiewra (1987), incorporating pauses during lectures to permit time for note taking can cause an increase in comprehension and understanding. Both studies used over head transparencies or PowerPoint slides that contained key words, definitions, and examples. Williams and Eggert (2002) hypothesized that visual cues and information provided on transparencies might equalize the note taking and exam performance of students with disparate abilities. These instructional strategies may have masked the relative benefits of using guided notes to supplement lectures.

In another study done, Wynegar and Fenster (2009), found the importance of the lecture format had the highest grade point averages and one of the lowest failing rates of all teaching strategies. In this study, they compared four different teaching methods:
Guided Notes

traditional lecture, computer-aided instruction, online delivery method, and the use of television. They demonstrated that lecture is still used currently and that it had the highest effectiveness on student achievement.

The literature supported that students would have an increase in academic performance. Musti-Rao et al. (2008) stated that students preferred and scored better with guided notes than other forms of instruction. As seen in this study, students overall quiz scores increased.

Conclusion

There are many factors that effect students’ abilities to learn and understand material. In order to convey information, different teaching styles and formats have been developed over the years. One of the most widely used methods is the lecture format. This method has shown to be effective for some students but not all. When guided notes are used in conjunction to the lecture more students are able to achieve improved academic performance.

In the traditional format of a lecture students listen and watch as the teacher writes down and discusses information. Typically there is little interaction or though that goes into to this method of instruction. For many students, lectures become boring or monotonous and this contributes to inaccurate or incomplete notes (Barbetta & Skaruppa, 1995). There is little time to process the information when provided and students have to look back at their notes to understand what is going on. If the students’ notes are faulty in some manner, then the student will have a much more difficult time understanding the information.
Guided notes allow students to listen, interact and comprehend what is being instructed (Armbruster, 2000). The key ideas or information is missing and students have to fill-in and complete the notes. While the information is being presented students are able to comprehend and understand the material being presented. This style of teaching also allows the teacher and student to interact with questions and verification that the notes are accurate and complete.

When using completed notes, students obtain very accurate notes but there is typically little interaction. Completed notes allows the students to have all the information that the teacher is going to present but many students have a difficult time staying focused on the notes. Many students realize the notes are all provided and therefore there is no need to continue to stay focused on the notes.

During this study, the students demonstrated and supported the claims of previous research on the effects of guided notes. Guided notes are a benefit to academic achievement and developing students understanding of material. A positive side-effect of guided notes, was students improved attention and attitude. As the students became more involved, there were less distractions and class room issues.

*Expand Study*

There are several factors to this study that could be expanded or further researched. These elements may have caused the data to present itself in a particular manner that supported the previous research. These factors include: location, timeframe, time of day, and subject matter.

The location of this study was done one school in the inner city of Rochester, NY. A more diverse population would be needed to examine how effective guided notes are to
all different types of students and abilities. Guided notes have been found to be useful for students with disabilities and high needs students but more research could be done with all students.

It is possible that in this study the time frame was not long enough. A two week trial is a good starting point but does not show substantial findings. A longer study would demonstrate the effects of guided notes on overall performance. If the duration of this study had been longer than there might have been a substantial increase in test scores.

The time of day may have an effect on student performance. To compensate for this, this study placed one morning and afternoon class together. In future studies, the effects of time could be taken into account and determine if it is a factor toward learning.

Another aspect that this study could be expanded on is to test the effects of guided notes in all of the core subjects – math, science, english, and social studies. Being able to look at different subjects using the same methods would allow researchers to obtain a better idea of the effectiveness of guided notes. This would also allow researchers the ability to determine if guided notes were more effective in particular subjects or there overall effectiveness in improving knowledge.

Final Thoughts

What this study has been able to demonstrate is that quiz scores and attitudes improve over a short period of time when guided notes are used. This has helped support previous research that also concluded that guided notes are effective in the classroom. The improved attitude and reduction of disturbances from the students was a by-product of their increased involvement using guided notes.
Guided notes have shown that they can be an effective strategy to use in the classroom. They teach students how to take notes effectively and absorb more course content while the information is being provided. Taking efficient and accurate notes can be difficult for students and guided notes assists students with the process, organization and format of note taking. More research is needed in the secondary level of education, but the research has shown that guided notes have a positive effect on learning and the classroom environment.
Reference:


Strategy assessment and instruction for students with learning disabilities (pp. 325-354). Austin, TX: PRO-ED.

Rickards, J., & Friedman, F. (1978). The encoding versus the external storage hypothesis in note taking. Contemporary Educational Psychology, 3, 136–143


### Appendixes A

#### GROUP A

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</table>

| Mean Score | 4.2  | 4.2  | 4.5  | 4.3  | 3.6  | 4.5  |
| Mean Score | 4.7  | 3.8  | 4.3  | 3.9  | 4.0  |

| Percentage | 0.83 | 0.84 | 0.90 | 0.87 | 0.71 | 0.90 |
| Percentage | 0.95 | 0.76 | 0.86 | 0.79 | 0.80 |

<p>| Over All   | 85.73 | 82.70 | Over All | 85.55 | 83.81 |</p>
<table>
<thead>
<tr>
<th>Guided Notes</th>
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Mean Score: 4.2 4.2 4.2 4.6 4.0 4.6
Mean Score: 4.5

Over All: 83.89 88.60

Guided Notes: 88
Completed Notes: 84