

Evaluating the Effectiveness of Reading Strategies for College Students: An Action Research Approach

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Abstract

This study was an action research project evaluating the effectiveness of selected reading strategies on student learning. The action research was conducted in an undergraduate measurement course in a teacher preparation program. Students used a pre-selected reading strategy to read assigned readings then completed a quiz on the readings and a survey on their perception of the effectiveness of each reading strategy. A mixed-method approach was employed. Results indicated the active processing strategies were effective, with the "I" graphical organizer was perceived by most students as an efficient tool for quizzes and was also perceived as being more efficient than reflections.

Assigning readings for homework, to be completed outside of class time, is a common practice in higher education. The abundance of content information and limited face-to-face instruction time often results in a moderate to large amount of outside reading for college students. During informal and formal class discussions, students very rarely discuss any formal reading strategy. The National Endowment for the Arts conducted the largest household survey to date and reported a disappointing state of affairs for the reading habits of college-aged students (NEA, 2008). Only one third of 12th grade students are at or above reading level (NEA, 2008). Among adults between the ages of 18 to 24, reading proficiency has decreased more than any other age group (Gioia, 2006). Similarly, the *ACT's* High School Profile Report noted only 53 percent of the students who took the ACTs were ready for the college-level reading requirements (ACT High School Profile Report, 2008). In addition reading readiness for college, employers identified reading and writing as top deficiencies of new employees (Wachholz, Ray, Hibbard, & Ndiang-ui, 2010). Secondary teachers of all subjects have been told all teachers are teachers of reading for years (Wachholz et al., 2010). The lack of reading proficiency of incoming college freshman may now extend the notion of all teachers are teachers of reading to instructors of higher education.

Rationale

An instructor of higher education at a small liberal arts college was interested in examining the impact of reading strategies with undergraduate college students. The instructor typically assigns weekly readings throughout semester courses and was disappointed in the student outcomes. Each semester, students were provided with a list of reading assignments including questions the students are responsible for answering. Most of the time, the comprehensive of the readings were

assessed through short quizzes and small and large group discussions. Over the years the instructor was disappointed in not only the quiz scores, but student responses to discussion questions in class. Discussions with students indicated they either do not want to read, or have trouble comprehending the readings. As a result, the instructor began to focus on the reading behaviors of college students.

Memory, Comprehension, and Learning

Performance on quizzes and class discussions are dependent upon a person's memory and comprehension, examining the way memory operates is imperative. Specifically, investigating the ways in which people remember information is critical. Craik and Tulving (1975) presented evidence supporting the importance in the processing of information, not the structure of the memory. Subjects in their study who actively processed information remembered more than other subjects: "Subjects remember not what was 'out there', but what they *did* during the encoding" (p. 292). This study presents the idea that *how* information is processed is the determining factor in memory. Klein and Salts (1976) investigated the concept of differentiated levels of processing with the semantic realm. Their study examined the effects of the number of dimensions used to process information had on recall; the results indicated the greater number of dimensions used, the better the recall, especially if the dimensions were not correlated to each other. Craik and Tulving's (1975) and Klein and Saltz's (1976) studies demonstrated the improved memory of subjects who actively processing information using different dimensions compared to subjects who did not.

More recently, Wolfe (2010) discussed the concept of "elaborative rehearsal" and states the process "requires students to reflect on the information being taught, relate it to something they already know, form meaningful mental associations" (p. 158). Nuthall (1999) proposed the use of "multiple representations of the same experiences" (p. 326). Nuthall (1999) proposed students learn when they are given the opportunity to express knowledge in different formats, and he also recommended the use of narrative and interactive activities such as group work. Another example of using different dimensions to aid learning and remembering comes from Willis (2006); Willis endorses activating multiple senses, looking for patterns, connecting the school experience to the student's outside experience, creating an authentic product, and interpreting the material. Marzano (2007) advocated using the processes of comparing/contrasting, hypothesizing, summarizing, and using nonlinguistic representation

Using different dimensions (making connections) to learn also includes the act of monitoring one's own learning. People possess different learning styles and individuals have the capability to analyze her/his knowledge style (Tobias, 1994). According to Tobias (1994), "learning how to recognize and appreciate learning styles can help you identify the natural strengths and tendencies each individual possesses" (p. 9). Costa (1984) discusses self-monitoring skills which include knowing when a sub goal has been attained, finding and analyzing errors, and choosing appropriate strategies.

Reading Strategies

A key ingredient to the reading effectiveness of students lies in teacher perception of what the reading comprehension process really entails. Formerly reading was viewed as the simple process of decoding text, with the student or reader receiving the information presented by the text. Today, it is seen as “a dynamic process in which the reader works actively to construct meaning” (Barton, 1997). This dynamic process consists of different types of concrete strategies. Harvey and Goudvis (2000) present seven such strategies:

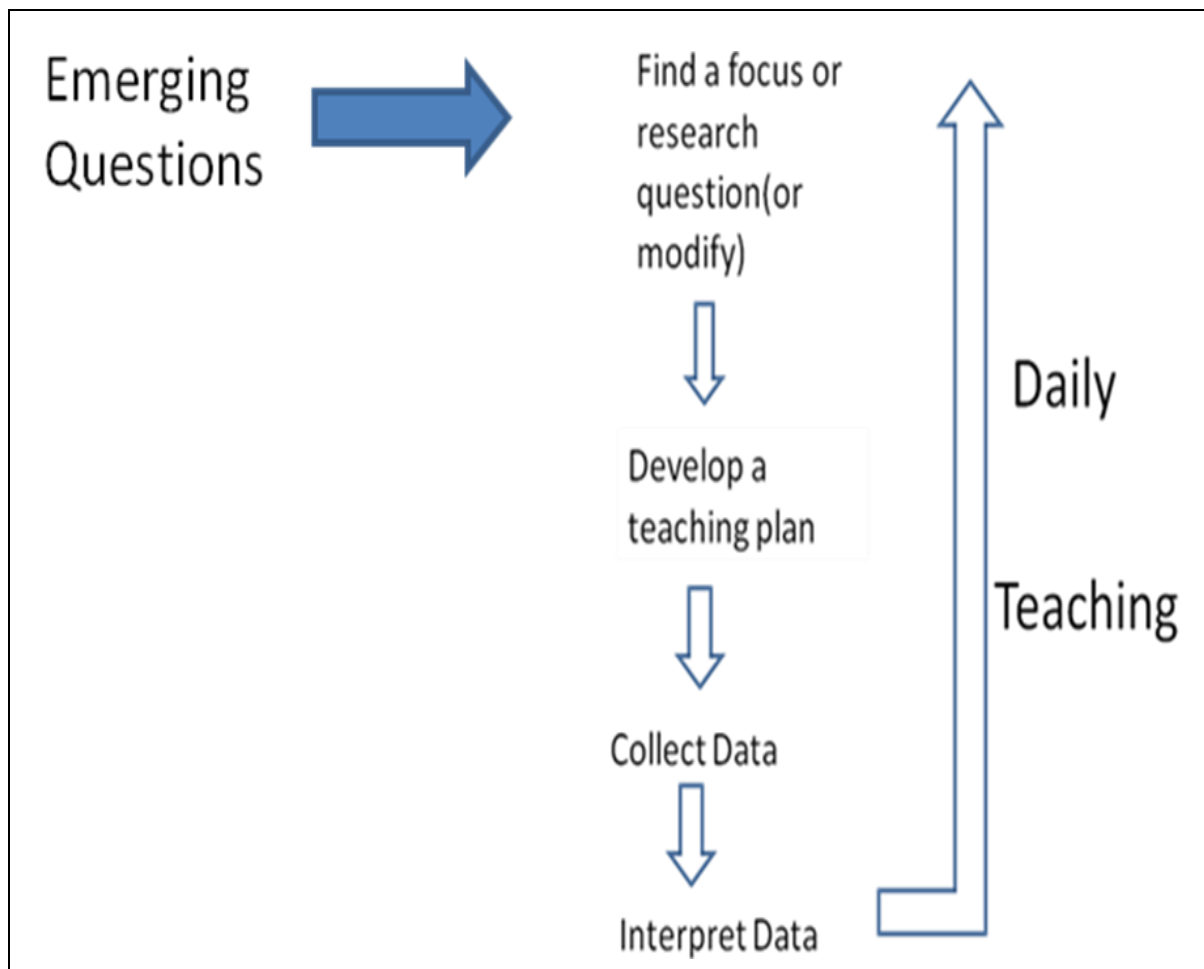
- Making connections between prior knowledge and the text
- Asking questions
- Visualizing
- Drawing inferences
- Determining important ideas
- Synthesizing information
- Repairing understanding

The reading strategies described above can be summarized as being “Constructivist”, or “Student-Centered”, or “Active Strategies,” (Pelech, 2010). The core element of these types of strategies is the students are not receiving information, rather the students are creating information by analyzing it and re-organizing information in order to create a new mental space. The strategies used in this study, are of the “Student-Centered” nature.

Method

Action research approach was used to evaluate the effectiveness of different reading strategies for students in an undergraduate education course. Action research is a systematic approach of inquiry in which the teacher/researcher, administrator, or counselor gathers information in order to examine ways to improve his/her school or classroom, or how to improve student learning (Mills, 2003). Another view of action research is a continual process of formal inquiry asking educators to examine their practices and context; this then leads to exploring changes in their practices and examining the effects of these changes (Calhoun, 2002). Action research is conducted in a naturalistic setting; the emphasis is on the teacher teaching, with the data being collected in this contextual setting. Action research is usually conducted in a cyclical frame, and consists of discrete phases. Once the steps have been completed, the educator/researcher looks for cognitive disequilibrium in the form of a new focus, or new and emerging questions. With these new (emerging) questions as the focus, the cycle begins again. The action research cycle, as used in this study, is shown:

Figure 1.
The Action Research Cycle



The focus of this study was to examine the effectiveness of reading strategies used by students to prepare for quizzes and class discussions. The following research questions were used to guide the study:

1. What reading strategies are effective for preparing students for quizzes?
2. What reading strategies do undergraduate students perceive to be effective for achieving high scores on quizzes?
3. What type of reading strategies do college students perceive to be effective for them in regards to depth of understanding?

To answer the research questions a plan was created based on regular classroom activities. The typical class schedule contained two parts: class readings were provided with a “Problematic”,

and then a quiz was administered based on the class readings. A Problematic is an authentic situation education students will encounter during their teaching career; like all authentic situations, it is ill-defined, messy, and will not have one solution. An example of a Problematic is shown in Figure 2.

Figure 2.

An example of a Problematic- The Standardized Score Problematic

THE STANDARD SCORE PROBLEMATIC

You are talking with some colleagues right after your first Parent Teachers Night. The principal joins the conversation. You share one conversation in which one parent stated that his daughter scored a 21 on the ACT and that he is confused with what these scores mean. Two of your fellow teachers relate similar stories.

The next day the principal contacts you, and states that he has heard many of the same stories from other teachers. He wants you to head a project that will educate parents on the meaning of these standardized test scores. He has indicated to you that you must either write a newsletter, or design a manual explaining to parents (most of these parents have had no more than some training in Algebra I). The topic is to explain, in simplest terms, what a 21 on the ACT means.

A reading list was provided to aid students in working through each Problematic (Authentic Situation) covered in class. The Reading list for this Problematic consisted of a variety of online resources surrounding standardized tests and interpretation of the results. Each reading included a set of questions, which formed the basis of the quiz given to students. A quiz was administered for each Problematic in the course. A total of three Problematics and six quizzes were included as part of this action research study.

By definition, teacher action research is conducted within in the context of the normal classroom paradigm. Since the normal class paradigm was to have quizzes, it was a normal extension to have a quiz followed by a survey concerning the student perception of the success of the reading strategy that was used.

The data from this study were both quantitative and qualitative. While each form of data had its own purpose, both types interacted with each other. The quantitative data were in the form of quiz scores and numerical ratings of the effectiveness of the reading strategies. Qualitative data came from the open-ended questions of the survey, student interviews and instructor observation. Statistical tools used for the quantitative data were the mean, median, and mode. Overall, the purpose of the quantitative data was to describe and summarize the relationships developed by the study. The purpose of the qualitative data was to develop the *meaning and significance* of the data for *the student*.

Procedures

An initial quiz (Quiz 1) and survey were used to develop baseline data. For this initial survey (Week 1), students were to use a reading strategy of their own choosing. The purpose was to obtain data on what they already do (prior knowledge) and their perceptions of the effectiveness of these strategies. Since this was the beginning of the semester and some administrative issues and procedural issues had to be presented, limited time for discussion was anticipated: thus, students were not required to rate the effectiveness of their selected reading strategy in regards to discussion. The survey had two items in which students responded on a four point liker-scale: strongly agree, agree, disagree, and strongly disagree. The two items were: 1. The reading strategy helped with the quiz, and 2. The reading strategy helped me with the class discussion and helped me have a deeper understanding of the Problematic. A third item was open-ended and allowed students to provide any other comments they had on the reading strategy. During week 1, students were given the opportunity to choose their own strategy. In order to analyze the responses from Week 1, codes were developed a priori to analyze the responses. The coding for the Week 1 quiz was:

- **Read Notes and Highlight**- this category included taking notes, reading aloud, highlighting important facts or a combination.
- **Read and Looked for Answers**- this category included the strategy of looking at the questions from the reading list and then looking for the answers in the reading.
- **Interaction**- This category included any activities as having friends quiz them after the reading, quizzing friends on the way to class, discussion with friends, and pair/share.

The quiz scores for the first quiz (pre) yielded baseline data for the study. The mean was 82.87%, a C+ for this course, the median and the mode indicate students' selected method was effective. No specific conclusions could be made whether a relatively mediocre class result was a result of the weakness(es) of students' method or the result of students not being mentally disciplined or the result of the negative effects of outlier values. Table 1 presents the data from the quiz scores.

Table 1.
Mean, Median and Mode for Quiz 1

	Quiz 1 (n = 31)
Mean	82.87
Median	100
Mode	100

The preferred methods and student perceptions of the effectiveness of their selected method are described in Table 2. The data from the Table 2 indicated that students scored successfully on the quiz and the majority of them felt that their strategy was effective. A close look at the Table 2 indicated that 16 out of 28 students used the technique of highlighting and taking notes, a technique that is considered “traditional.” It must be noted that no data were provided by students from the “highlight” category to determine if this method was a form of “active” processing. Another eight students used what can also be considered a traditional method, that of looking for the answers. Only four (4) students participated in what could be considered “Interaction” activities; they utilized such activities as quizzing each other and Think/Pair. This category represented an “active” approach.

Table 2.

Student Perceptions of the effectiveness of their selected strategy

Strategy	Student perception of effectiveness of strategy		
	Strongly Agree	Agree	Disagree
Highlight, take notes (n = 16)	4 (25%)	11 (69%)	1 (6%)
Read, looked for answers (n = 8)	2 (25%)	6 (75%)	0 (0%)
Interaction (n = 4)	3 (75%)	0%	1 (25%)

Emerging Questions and Action Plan Modifications

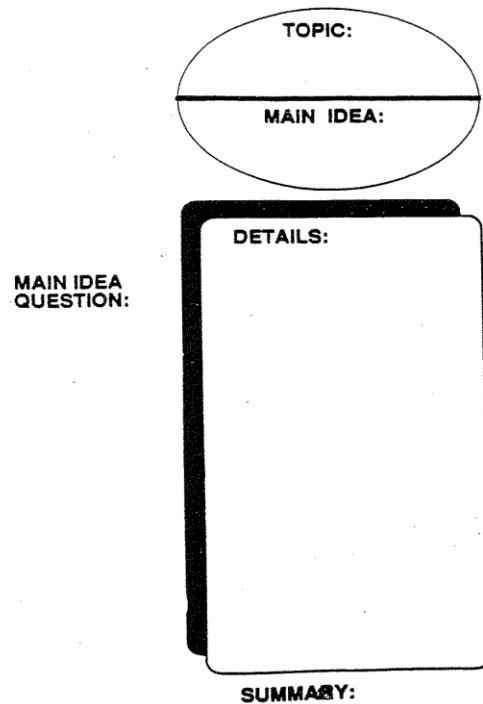
The majority of students used reading, taking notes, and highlighted key points, they offered no comments indicating what they were thinking; additionally another four (4) students utilized the technique of just looking for the answers. The initial quiz results indicated the majority of students may or may not have created any “mental connections/spaces.” The results led to the researcher to investigate which reading strategies would enable students to make connections while they are reading, and if other reading strategies would improve student quiz scores and enhance student participation and contributions in class discussions.

Based on the initial quiz and survey results, the action plan focused on the types of reading strategies to use. The instructor used constructivist and cooperative learning strategies as part of the class structure, such as Think/Pair/Share and reflections. These types of activities were blended into the course. The following strategies and sequences were used:

1. Students wrote a one-page reflection blending their answers to the questions; here the students used the answers to the questions to create an essay that summarizes the reading.
2. Students wrote a one-page reflection and used the cooperative learning activity “Think/Pair/Share” to summarize their reflection for their partner.

- This strategy used the “I Graphical Organizer”, which is shown in Figure 1. *This visual was taken from the Phi Delta Kappa seminar (approximately twenty years ago) conducted by Larry L. Welch, Ed.D. The visual was attributed to William L. Christen and Thomas J. Murphy.* It is important to note that this organizer uses the visual mode as well as the written mode. Students are to put the topic and main idea in the “dot” above the “I”, put what they believe should be the main idea question, and write a three-sentence summary. An example is shown in Figure 3. Students were given blank copies of this organizer, but many chose to either create their own using paper, pencil, and a straight edge or create their own using the computer.

Figure 3.
The “I” Graphic Organizer



Note: *This visual was taken from the Phi Delta Kappa seminar (approximately twenty years ago) conducted by Larry L. Welch, Ed.D. The visual was attributed to William L. Christen and Thomas J. Murphy.*

- Students wrote a one-page reflection and used both the cooperative learning activity “Think/Pair/Share” to summarize their reflection for their partner and the “I” Graphic Organizer.

Each week the reflections were graded. Students completed a survey consisting of selected response and open-ended items. The action plan consisted of a cycle using each of four strategies consecutively. The following schedule was used:

Quiz 1- Quiz on Readings using the strategy of writing a reflection embedding the questions.

Quiz 2- Quiz on Readings using the strategy of writing a reflection embedding the questions, followed by a Think/Pair/Share.

Quiz 3- Quiz on Readings using the “I” graphic organizer.

Quiz 4 - Quiz on readings 3 and 8 from the Action Research Problematic, using “I” graphic organizer with a Think/Pair/Share.

Results

An important parameter for any type of research is that of validity and credibility. Since all action research is done in a “natural setting”, certain occurrences may affect the validity. In this case some students were absent when certain statistical analyses were performed. Later on, they made up the quiz they missed and their scores were included in the data set. As an example, a student may have missed Quiz 2 and data on Quiz 2 was performed without this student’s score. Later, when the student made up the quiz, the score was included in the data set and this “updated” data set may have been compared with other data sets.

The baseline data was collected prior to Week 1, when students were able to use their own reading strategy. Table 3 displays the results from student weekly quiz scores.

Table 3.

Student quiz scores with reading strategy

	Baseline (Prior to Week One)	Week 1	Week 2	Week 3	Week 4
Strategy	Students choose their own strategy	Reflection	Reflection with Pair/Share	“I” graphical organizer	“I” graphical organizer with Pair/Share
Percentage, Letter Grade	82.87	81.11	88.35	93.84	84.96

The quiz scores for all five strategies indicated that each of the strategies was successful to a degree. The mean scores of quizzes ranged from C+ to A-, with only one mean score being in the A range. This A score came from the “I” graphical organizer method.

Surveys were used to examine student perceptions on the effectiveness on each of the four reading strategies. The results indicated that each of the strategies was perceived as effective for both quiz preparation and for class discussion. The surveys asked students to rank the effectiveness of the reading strategy in terms of quiz preparation and class discussion. Table 4 displays these results. The coding system was: 4= Strongly Agree, 3=Agree, 2= Disagree, 1= Strongly Disagree.

Table 4
Mean Ratings for the effectiveness of Strategies

	Mean Effectiveness of Strategy for Quiz	Mean Effectiveness of Strategy for Discussion
Quiz 1	3.2	3.42
Quiz 2	3.23	3.33
Quiz 3	3.32	3.23
Quiz 4	3.14	3.24

The results indicated students found each of the five methods effective in preparing them for quizzes and the class discussion. Differences in ratings were not significantly different. It is important to note all students agreed with the statement that the strategy was effective.

The open-ended questions from the survey provide insight into student perceptions concerning the Reflection and Reflection/Pair/Share strategies. The comments from the surveys provide insight into the meanings for students. The comments refer to the Reflection strategy or to the Reflection/Pair/Share. Table 5 provides examples of comments presented.

Table 5.
Student Comments on Reflections Strategy and Think Pair Share

Reflection Strategy	Think Pair Share
<i>I think writing the summary helped me understand the information better.</i>	<i>I think they have helped (reflection and Pair/share)</i>
<i>I cannot remember all the terms word for word but I retained the <u>ideas</u> that were maintained in the text and in the article.</i>	<i>The pair share was nice because I can usually remember things better when I say them aloud</i>
<i>The only reason why this reading strategy didn't really help with the quiz is because I spent more time writing and making sure it was well written rather than memorizing some of the info.</i>	<i>I liked doing the pair share ...it really helped to reinforce the information that I learned.</i>
<i>Sometimes it takes away from memorizing the answers because I am focusing on the paper.</i>	<i>If we had longer time to share our reflection it would have helped...the reading strategy really helped.</i>

Students' comments demonstrated students' perception of the effectiveness of the reflection strategies, and also indicated students' recognition of reflection as active mental processing. Comments and phrases such as "expand on", "I understand the information better," "reinforce the information", and "as I could hear what my partner had to say," provide this evidence. Some students stated they wanted more time for the Pair/Share whereas others had mixed feelings on Pair/Share. This was consistent with the quantitative results. Some students reported writing the reflection took away from their memorization of the answers to the reading questions; since the purpose of the reflection was to move away from memorization and to remember through a connected concept, this comment suggests further examination on the effectiveness of reflections be done.

Positive survey comments indicated students thought the "I" graphical organizer enabled active processing skills which could be combined with other strategies already used by students, and was an efficient tool. Following is a sample of these comments:

- *I think it really helped me get the main points of the article down on paper in a clear way to see them.*
- *This was a way more helpful way for me to understand and comprehend...rather than writing a reflection.*
- *It was fast and easy to learn from.*

- *It helped me pull out the main points and review them in an organized fashion.*
- *The “I” graphic organizer will help me with the problematic by organizing my thoughts and information learned.*

The survey comments pointed toward the “I” organizer’s ability to enable students to actively process the readings. Comments indicated the students thought the “I” graphical organizer (“I”) prepared them for the quizzes, and inferred the organizer enabled active processing. Also, students indicated the “I” was a very efficient method of organizing and presenting information. While some students noted the “I” helped them with discussions, others thought the reflections were more effective.

Emerging Questions and Modifications to Plan

The data indicated all four methods were found to be effective by students and all four methods enabled active processing. However, there was not a great deal of evidence discussing what types of active processing were used for each method. While there was apparent enthusiasm for the “I”, subsequent t-tests did not yield any statistically significant difference. Thus, it was not clearly apparent at this stage which strategy was most preferred by students. The data from the previous five quizzes and strategies indicated that students had a “preferred” strategy (though it was not clear which one it was), and it was in the best interest of student learning to conduct a final phase in which students would chose their preferred reading strategy.

The final part of the study allowed students to choose their preferred method (this included methods not used in previous weeks). Table 6 below shows method selected and students’ perceived effectiveness of this strategy.

Table 6
Student selected strategy and ratings

Strategy	Quiz Rating	Discussion Rating
Writing (n = 1)	Strongly agree= 1	Strongly agree = 1
Reflection (n = 3)	Strongly agree = 1 Agree= 2	Strongly agree= 1 Agree = 2
Think/Pair/Share (n = 1)	Agree= 1	Agree = 1
“I” organizer with Think/Pair/Share (n = 1)	Strongly Agree = 1	Strongly Agree = 1
“I” organizer N = 24	Strongly Agree=15 Agree = 9	Strongly agree= 14 Agree = 10

The “I” graphic organizer was selected by the most students when provided with a choice of method. Only one student opted to use the Think/Pair/Share, and one only student chose to use the “I” graphic organizer with the Think/Pair/Share.

Summary

This study examined the effectiveness of pre-determined reading strategies on quiz scores and class discussion. The pre-determined reading strategies were student-chosen strategies, reflections, think/pair/share, the “I” graphic organizer, and the “I” graphical organizer with Pair/Share. The study used student quiz scores, student surveys, and instructor observation to collect data. The following points summarize the results. Overall, active processing strategies were effective for preparing students for quizzes. Students preferred the “I” graphic organizer over other strategies, and indicated it was efficient and visual. In terms of preparing for quizzes, students found the “I” graphical organizer to be the most effective. The perceived effectiveness of the “I” for class discussion was mixed. Some students who preferred the “I” for quizzes preferred reflections for the class discussions.

Students comments indicated the “I” graphic organizer and reflections enabled them to be actively involved in the creation of their own knowledge base. Some students indicated that the “I” was ineffective because it did not enable them to process fully and in depth. Results from the surveys indicated the Pair/Share with another strategy was not as effective as other strategies. Students hesitated about whether they would use the “I” graphic organizer or reflection in other classes due to the element of time. While students indicated that they would use the “I” graphic

organizer in their own practice, they noted the time it took to explain and implement it may be a deterrent.

Conclusion

There were some limitations to this study and unanswered questions. Only undergraduate students were included in this study. Results may be different if graduate students were included in the sample. The degree to which students preferred a technique was not answered. While students might choose “Strongly Agree” or “Agree”, student comments from the surveys and interviews indicated the *degree* of their perception was not fully described by the present system.

While students preferred the ‘I’ graphic organizer for quizzes, the extent to which students would prefer the strategy if quizzes contained higher level items is unknown. Students’ perception of the ‘I’ graphic organizer’s effectiveness may have been different if higher level items were posed. In addition, connection of the ‘I’ graphic organizer strategy to an effective class discussion was not strongly supported. Students thought the reflections and the ‘I’ graphic organizer were effective, but no evidence was provided to connecting student perceptions to an increase in learning.

The purpose of this study was to evaluate the effectiveness of different reading strategies used by undergraduate education students as instructed by the professor. According to the results, students found the ‘I’ graphic organizer to be the most useful for demonstrating knowledge of their reading. The vast majority of students in the sample chose to use the ‘I’ graphic organizer when given a choice of strategies to use. Teaching undergraduate students how to use reading strategies such as the ‘I’ organizer can be a useful technique to aid in student learning.

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