

CHAPTER SIX

Interpretation of Data and Discussion

Metacognitive Aspects

The data revealed that the grade fives were able to use the metacognitive strategies that had been taught as part of the unit plan. Most of the students found using metacognitive strategies for this project to be helpful. Many students indicated in their journals or during interviews with me that awareness, planning or self-evaluation were valuable processes that they were aware of having used and that they would find useful for future library research projects. Self-regulation was one metacognitive aspect that most students were not as aware of having used. This aspect was more difficult for the grade fives to comprehend. Perhaps more time devoted to developing awareness of this metacognitive aspect would have been beneficial to the students.

There was evidence that the metacognitive aspects--awareness, planning, self-evaluation and self-regulation--could not be confined to rigid categories. The categories had leaky boundaries. Awareness occurred during planning, self-evaluation and self-regulation. Self-regulation was evident when students evaluated themselves. Regulating one's own thinking and behavior often seemed to lead to more planning and self-evaluation. Self-evaluation and self-regulation seemed to influence the planning that took place for all of the students' activities. I noticed this when I read students' statements in the thinking journals. For example, it was necessary for students to assess and evaluate the information they had in order for them to plan for further information retrieval. Self-regulatory statements were often embedded in or followed by planning and self-evaluative statements. From this evidence, I suggest that there was an ongoing dynamic interplay between these aspects of the metacognitive process.

Reflection

Reflection was an integral part of the metacognitive aspects. Reflection also seemed to be a prerequisite to aspects like planning, self-evaluation and self-regulation. Planning demanded that students reflect on task requirements as well as on past experiences. In order for students to evaluate themselves it was necessary to reflect on past actions and experiences. Similarly, before students could regulate themselves, they had to reflect on past events and their behavior and recognize a need to regulate their thinking and behavior.

Awareness

Flavell (1979) discussed four classes of phenomena that are instrumental in metacognition: metacognitive knowledge, metacognitive experiences, goals and actions. Metacognitive knowledge includes knowledge of person, knowledge about a task, and knowledge about strategies that would be most effective in successfully completing a task. The data I acquired throughout the research project revealed that students were aware of and had knowledge about themselves, knowledge about tasks and knowledge about strategies.

Flavell (1979) stated that metacognitive knowledge “can lead you to select, evaluate, revise, and abandon cognitive tasks, goals, and strategies in light of their relationships with one another and with your own abilities and interests with respect to that enterprise” (p. 908). This was evident in how students chose resources, changed topics, planned for procedures, and revised their stories. Flavell also believed that metacognitive knowledge can lead to metacognitive experiences “concerning self, tasks, goals and strategies and can also help you interpret the meaning and behavioral implications of these metacognitive experiences” (p. 908). Awareness and reflection helped students interpret the meaning of their metacognitive experiences. Self-evaluation was also a process instrumental in interpreting the meaning and behavioral implications of students’ metacognitive experiences.

Students’ awareness, demonstrated throughout the project, relates to the knowledge phenomenon outlined by Flavell. Awareness seemed to be a prerequisite

process to other processes in metacognition. For example, in order for students to plan effectively they needed to be aware of themselves and of the needs of tasks, as well as of task strategies and goals. The grade five students exhibited awareness of themselves, of knowledge, tasks and strategies, of their behavior and experiences, of their difficulties and successes, and of other people. Therefore, awareness had many facets.

I looked for a relationship between how students approached and completed tasks and the frequency of awareness statements in the students' journals. It was difficult to come up with a definite relationship. The amount of awareness exhibited differed between the students. James demonstrated a high degree of awareness about tasks and his own abilities when he wrote in his journal. Terry had a high frequency of awareness statements in her journal and her behavior showed evidence of awareness throughout the project. She was able to closely monitor herself and her experiences and take action according to what she monitored. Students who had a higher frequency of awareness statements in their journals seemed to be more conscious of themselves, their experiences, and the progress they were making.

One exception to this generalization was Stewart. Stewart showed a high frequency of awareness statements in his journal (see Table 3) but throughout the project he did not exhibit this same awareness. When students planned their science fiction stories, he lacked the elements that we had outlined. His information retrieval page had little information on it and his story contained no factual information. He seemed unaware of the goals of the project and what needed to be done in order to achieve them.

Planning

The most tangible metacognitive aspect, planning, involved students planning for time, planning for materials, scheduling procedures, and setting goals for themselves. Students relied on planning webs to help guide them through the library information retrieval process. The plans for their stories on story maps shaped what they wrote and assisted them with the composing process. Many grade fives

commented on how easily their ideas flowed while they wrote their stories. According to Flower and Hayes (1980), plans reduce “cognitive strain” during the writing process. The planning procedures used by the grade five students may have reduced some of the number of demands requiring conscious attention while they composed their stories.

Students’ views about planning differed. Elizabeth did not see merit in writing down plans because when her plans changed she became frustrated. Shawn wrote that his thinking journal was not helpful to him because “all I did was write in it to set my goals” (Journal, March 19). Shawn did not see any value to writing down goals in a thinking journal. A number of other students thought planning was a metacognitive strategy that helped them. Terry and Kathy wrote in their journals that using a thinking journal to plan helped to keep them organized. Alice wrote that using a thinking journal helped her plan how her research would go in the library and “it helps me plan and I like it because it would help me not be confused” (Journal, March 19). Kari liked being able to plan her day and how she was going to do it (Journal, March 19). During the student interviews, Terry, Tim, Greg, Kathy, and Ben mentioned that planning was a metacognitive strategy that helped them.

All of the students were able to produce plans for what they intended to do. The amount of detail students included in their plans varied. During the students’ research in the library, planning mostly involved planning which center to go to for information and mentioning topics for which information they wished to retrieve.

Planning did not always ensure that plans were followed. At times this was because of a need for plans to change--a center in the library had the maximum number of students, someone was unable to find information they wanted at a center, information retrieval notes were misplaced, or a story needed to be altered for some reason. It was amazing how flexible most of the students were about changing their plans.

A few students made plans but did not follow them. An example of this was on March 5 when Trevor and Sam wrote down plans for library research in their journals. I observed them in the library wandering about, appearing to be unfocused.

Trevor had intended to "write all the important stuff down like what my planet looks like" (Journal, March 5) but he took no notes in the library. This particular lesson we devoted most of the afternoon to working in the library. Trevor had good intentions but he seemed to not be able to act on them. Trevor wrote in his journal, "My thinking journals was not that Helpfull because It was hard for me to do what I wrote" (March 19). Trevor was aware of the difficulty he experienced in carrying out his plans.

Self-evaluation

Self-evaluation was a process that, like awareness, had many facets. Students evaluated a number of phenomena that related to themselves. Students reflected on and then evaluated their progress, their readiness to proceed with tasks, their behavior, their learning and feelings, and their success or lack of success throughout the process of the project. There was a strong relationship between the frequency of awareness statements and the frequency of self-evaluation statements in the students' journals.

Self-evaluation was used a great deal by students throughout the project. Students seemed to be able to monitor how things were going for them and they did this regularly. This monitoring was done consciously because they used thinking journals. The thinking journals were tools to assist students with monitoring the processes in which they were engaged.

I found that I evaluated myself a great deal. This process was essential to my planning and decisions that were made concerning the project. My reflective journal was instrumental in sorting out my thoughts and assessing my progress and it was through these processes that needs to alter my own thinking or behavior became apparent. I believe that my own experience using my reflective journal was similar to that of the grade fives using their thinking journals.

There were differences in how well students were able to evaluate themselves. Some students were very thorough when they reflected on their experiences and assessed their progress. Other students were more limited in how they evaluated themselves.

One of the criteria I outlined as evidence for self-evaluation in the Research Framework was students asking questions of themselves. There was no evidence that the grade fives asked themselves questions during the research project. Perhaps they did but did not articulate the questions or write them down.

Self-regulation

After looking at self-regulation statements in the students' journals, I realized that many self-regulative statements followed self-evaluative statements. Self-evaluation seemed to be a prerequisite to self-regulation. It was necessary for students to self-evaluate in order to realize a need to alter their thinking or their actions. There were several instances where self-regulation statements were also coded as self-evaluative. There was an overlap between these metacognitive aspects.

The frequency of self-regulation statements in the students' journals was low compared with the frequency of statements showing awareness, planning and self-evaluation. However, I do not interpret this as evidence that students seldom regulated their own thinking and behavior. Although the grade fives did not often write about adjusting their thinking or behavior to achieve their goals, their actions throughout the project showed that they did regulate themselves. Students changed topics and story plans, they moved to different centers in order to retrieve desired information, they selected different resources, and they altered previous information when new or different information came to light. Students returned to the library for missing information and retrieved more information when they determined that there was a need. Students regulated their behavior and their attitudes. These examples are evidence that students were effective in carrying out self-regulation. There was evidence throughout this project that students were aware of needs to alter their thinking and behavior and that they were conscious of the changes that they made. How aware were students that they regulated themselves? Students did not appear to consciously think of these actions between awareness of need to make changes and the achievement of those changes as self-regulation.

Personal Reflections

My experience throughout this process has given me the opportunity to reflect on myself and my own experiences, to self-evaluate, to self-regulate, and to become more cognizant of my own mental processes. I found myself performing all the metacognitive aspects that I looked for in the students with whom I worked. At times when I was planning, evaluating myself and regulating myself, I was too busy to notice that I was engaged in these processes. It was only after the events when I took the time to reflect and write down my thoughts in my reflective journal that I understood how I, too, used metacognitive processes.

The evidence throughout the research project showed that metacognitive processes are extremely complex and that students differ in how they engage in the processes. Monitoring students throughout this project has given me the opportunity to understand that process experiences differ for students and that process experiences for some students evoke a deeper understanding of themselves. I believe that the grade fives who immersed themselves in their own metacognitive processes received a number of benefits. They experienced the benefit of consciously knowing themselves and knowing how they learned and they received the benefit of achieving goals and creating successful experiences for themselves, all of which facilitated personal enjoyment along the way.

I also acknowledge that at times we underestimate what children are capable of doing. The resourcefulness demonstrated by the grade five students and the insights that they gave in their musings exemplify the great capacity children have for acquiring and processing information. The students were expected to meet the demands of a complex research project and, for the most part, the grade fives were successful in doing this.

While I wrote about this research project and the metacognitive abilities of the students with whom I worked, I returned to the literature about metacognition many times. After rereading what other researchers had said about metacognition, I was disappointed that my findings and views were similar to those that had already been

written about. However, as I reread these same articles I realized that I had a much greater understanding about what the authors meant. Metacognition means more to me now. I have a greater understanding of Flavell's work and his model of metacognition. I have a greater appreciation for metacognition and the recommendations for teaching practice that other educators have espoused. It is through this kind of research that one gains a deeper understanding of that which the researcher seeks to illuminate.

Recommendations for Further Research

The teacher-researcher role that I adopted for this study worked well. I worked closely with the grade five students and we were able to get to know each other and to develop a rapport that would not have been otherwise possible. The students and I were comfortable with each other and the students responded enthusiastically, especially in their journal writing. The role of teacher has become a natural one for me and being teacher-researcher allowed me to collaborate with colleagues to create a "metacognitive unit plan" for a library research project and teach it as well as carry out research. The teacher-researcher role appealed to me because of the practical, educational nature of this kind of research. Burton (1991) has stated that the most powerful reason for carrying out teacher-researcher studies is "their potential for generating insider knowledge useful to educators in a manner that does not disrupt the classroom, but instead potentially enriches the quality of education that children receive" (p. 229). Because I was involved in teaching the unit, I think I was more attuned to the progress of the students and their needs. I was able to adjust lessons to guide the grade fives, to generate activities that would help them maximize their learning and that would also facilitate data collection for my research. Burton (1991) has suggested that teacher-researcher studies may help define a truly educational paradigm of research.

A teacher-researcher stance is not an easy one to take. There were a few lessons when I felt torn in different directions--torn between assisting a student and

madly writing field notes. I felt very much like I was “juggling a number of simultaneous constraints” (Flower & Hayes, 1982, p. 31). Perhaps feelings of inadequacy could be dispelled with more experience using research techniques and with more experience being a teacher-researcher. One tool that helped me was my reflective journal. At the end of a day, sketchy notes would trigger a flood of memories and occurrences and in this way I was able to fill in many blanks. Reflective journals are an effective way for teacher-researchers to use action and reflection reciprocally and thus guide future encounters with their students.

Triangulation was valuable to this study. The calculation of the frequency of certain statements in students’ journals provided a quantitative element to an otherwise qualitative study. Although the students’ journals provided the richest source of data, the questionnaires, my field notes and reflective journal, the student interviews, the student planning pages, the story evaluations, and the stories themselves all helped to give information about the grade fives and their metacognitive abilities. The main metacognitive aspects emerged in all of the data sources. The different data sources supported patterns that emerged and different facets of the metacognitive aspects became apparent. Contradictions in data were also evident when data was triangulated. For example, Stewart had a high frequency of awareness statements, but my observations of him indicated that he was less aware of the project goals than indicated by his journal statements. Also, George had a high frequency of self-evaluation statements in his journal, but during our interview he told me that he found it hard to evaluate himself and he did not identify self-evaluation as being a metacognitive aspect that was most helpful to him. These contradictions generated new questions in my mind and encouraged me to consider new perspectives.

The thinking journals were an effective way of tapping into students’ minds and revealing their thoughts. They were also an effective means of helping students consciously monitor their own thoughts about everything that was happening to them as they participated in the library research process. Blakey and Spence (1990) and Loeke (1992) advocated using journals as a means of developing metacognition. Blakey and Spence have contended that when a journal is used in this way it becomes

a “diary of process” (p. 13). The grade fives’ thinking journals were diaries of the processes students were engaged in as they participated in this library research project.

I find myself with many questions, evoked by my research. What happens in the metacognitive process of students who experience more difficulty than others when they carry out research endeavors? Although Trevor wrote plans for himself, he was unable to consistently carry them out. During one session he thought he was successful even though he had not achieved the goal of retrieving information in a way that was useful for him to write his story. Are these difficulties experienced by students an indication of a breakdown somewhere in metacognitive processing? If so, where? Self-regulation? Or self-evaluation? There is a need for further research to determine why some students have difficulty evaluating or regulating themselves. Perhaps further research in this area will lead to some valuable answers for teaching practice so that teachers will be able to intervene more effectively to assist students who flounder when approaching tasks and to encourage more independent learners.

This research was only one experiment with one group of children and the findings cannot be generalized to a larger population. There is a need to conduct research in this area with many students to paint a clearer picture of students’ metacognitive processes during library research. There is also a need to work with students over a longer period of time to determine students’ metacognitive abilities. Longitudinal studies where metacognitive strategies are taught, reinforced, and then where reinforcement is gradually decreased would show what students are able to do independently without teacher prompting.

Metacognitive research should be carried out with children of various ages. Are certain metacognitive aspects more teachable at certain stages of a child’s development? Vygotsky’s theory has proposed that learning leads development. This makes a strong case for teaching metacognitive strategies to children.

Implications for Teaching Practice

McGregor (1990) found that high school students tended to use intuition and not consciously think about their thinking while they gathered and used information to write research papers. McGregor also discovered that the students were not aware of ways to alter their thinking to be more productive. She stated that to these students “the process of thinking was a mystical, unexplainable phenomenon, one that had almost magical qualities” (p. 5). Therefore, in order for students to better understand their mental processes, intentional teaching about the mental processes involved and intentional teaching of metacognitive strategies would be beneficial. Teaching metacognition to children early in the school years may sow the seeds for a harvest of rewards in later years. Then, students would realize that their thinking is instrumental to success in library research and other learning tasks. Students would also realize that their thinking can be self-monitored and altered if a need to alter thinking arises.

At the end of the project, it was evident that a few of the students saw little value in keeping a thinking journal. They could not understand how their journal might have been of benefit to them. Reasons for their views ranged from the journal being of little use because it had no information in it that a student could use, to the journal infringing on the time students could have spent writing their stories.

However, most students did acknowledge value in their keeping a thinking journal. Some of the reasons included that it helped them to plan, it helped to keep them organized, it was a good way of keeping track of what they did, it helped keep their thoughts clear, and it helped them to focus on their projects and what they needed to do. From my perspective I think the thinking journals did all of these things and more. Students were also given the time and opportunity to connect with themselves and with how they learned and to consciously monitor the metacognitive processes in which they were involved. Pitts (1992) has stressed the need for personal reflection during research assignments and has advocated allowing time for students to do this. The thinking journals gave the grade fives the time and opportunity for personal reflection.

As I reflect on what we did with this grade five class, I have thought that in my own classroom I would start the school year off by introducing the students to a thinking journal. Over the years I have had my own students keep journals that are more diary-like, but I see great value in keeping a thinking journal. I visualize this tool as being a diary of process that may be used across the curriculum. That is to say that it may be helpful in any subject area but should not be overused. Throughout the school year I would move through the aspects of metacognition beginning with awareness and then planning. Later we would get into self-evaluation and self-regulation. Students would be taught specific "thinking" vocabulary and criteria for these aspects along with the strategies to develop these processes. This would be beneficial to any class of students.

Class discussions where students reflect on and then share their experiences is an important activity to encouraging metacognition in the classroom. Blakey and Spence (1990), Loerke (1992), and Hughes (1986) recognized benefits to having students verbalize their thinking skills and processes to others. "Frequent opportunities to verbalize thinking help students become more aware of reasoning" (Hughes, 1986, p. 36). During the project there were a few occasions when we had class discussions where students shared their metacognitive experiences. Although these were limited because of time constraints, I felt that these sessions were beneficial and with more frequent discussions like these throughout the school year, students would readily develop a metacognitive vocabulary and comfortably share their experiences. Problems might be shared and solutions proposed at the time of discussion. When students are metacognitively aware, then library research projects and other undertakings will be more manageable for students.

I contend that demonstrating the use of metacognitive strategies for students and teaching them to monitor their mental processes is valuable. It encourages thinkers to use strategies that will allow them to be successful in tackling life's problems and challenges. Teaching metacognitive strategies offers students a repertoire of tools that are available to them at all times. The better equipped the

executive monitor, the more positive challenging experiences will be for that person and the more likely the possibility of success.

Metacognitive strategies must not be taught in isolation. Just as library skills need to be taught within curriculum, teachers must ensure that metacognitive aspects are taught within the context of curriculum and with other learning processes. Presented in a meaningful way, metacognition becomes an integral part of learning for students. Metacognition is a process and cannot be fostered by teacher transmission. Like other processes it needs to be cultivated, applied, and honed through experience as it is applied to other learning.

Educators need to be conscious of their expectations for students and the possibility of overloading tasks that they give to students. The task we expected the grade five students to complete in this research project was a tall order. The students had so many constraints to deal with while they wrote their science fiction stories, that it very likely affected the amount of factual information they included in their stories. Hindsight tells me that the grade fives should have had more experience with incorporating factual information into their writing before we attempted this project. However, nothing ventured, nothing gained. This experience compels me to caution other teachers about overloading tasks for their students.

Teaching metacognitive strategies and having students monitor their metacognitive processes may be a powerful way for teachers' to know when and how to intervene. Using thinking journals and teacher observations might help teachers to determine where students are having difficulty and then provide the necessary guidance. A student who is unable to plan may require the teacher's help in organizing himself or herself and in setting goals. If it is clear from the journal entry and teacher observation that a student is unable to follow plans, this may signal the teacher that intervention is required. Monitoring how their students use metacognition is valuable for teachers to ensure that students learn how to use their mental processes to maximize their learning.

Teacher-librarians need to be aware of metacognitive processes and monitor the metacognitive processes of their students so that library research tasks will be

manageable and successful for students. In this way teacher-librarians can provide guidance in the metacognitive processes of their students. Teaching metacognitive strategies to grade five students worked well for our library research. The students were able to consciously monitor their metacognitive processes and I believe this heightened and enriched the library research experience for most of the students. Therefore, including metacognitive strategies as part of research projects for children is an important consideration.

Conclusion

It is evident that encouraging students' metacognition is an important step in helping students to achieve success in an information and technology rich environment. This study shows the potential for maximizing success for students who monitor their own mental processes. Students' thoughts were revealed as they engaged in the library research process. Although some students were more aware of their own mental processes than others throughout the project, all of the students had the opportunity to monitor their process experiences and their own thinking. How cognizant students were of their own thinking seemed to affect their behavior towards achieving the goals and sub-goals that they had set for themselves. This study also demonstrated that these grade five students were able to use the metacognitive strategies that were built into the unit plan.

Valuable learning occurs through process. Focus on process needs to take priority over product more often. Content learning has too often become the focus for students' learning in school. Students' engagement in process and awareness of their engagement in process is essential to their learning. Process learning can be transferred to other learning situations. In this way the stage can be set for lifelong learners to perform successful feats required by life's problems and challenges.

Almost two decades ago Flavell (1979) stated that ideas about metacognition at that time could someday be transformed into a method of teaching to encourage wise and thoughtful decision making and better learning in schools. With advances in

technology and the wealth of information available, it has become more necessary for students to plan and regulate their own learning. Therefore, to foster this metacognitive empowerment among learners it is important for teachers and teacher-librarians to include metacognition as a part of their teaching. Monitoring and regulating one's self are essential processes. Awareness, planning, self-evaluation, and self-regulation are key metacognitive aspects to knowing one's self and to improving one's learning.

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Appendix A

Student Questionnaire (Research Projects)

Research Projects

The questions below are all about library research projects. Please read each question carefully, think about **your** answer to the question, and write your response on the lines below each question. Thank you for helping me with **my** research project!

1. Tell me about a research project you have completed.

2. How was this project different from others you have done before?

3. What materials or resources did you use? How did you use them?

4. What worked well? Give some examples that you can think of.

5. Did you have any problems? Tell me about them.

6. **Think about writing a report.** How did you get started? How did you feel at this point?

7. What did you do in the middle of your report? How did you feel at this point?

8. How did you finish up? How did you feel then?

9. What were some of the things you learned?

10. How might what you learned help outside of school?

11. What did you like best about this research project? Why?

12. Was there anything you didn't like? If so, why?

13. Tell me about research you or other people do outside of school.

Appendix B

Sample Letter and Consent Form

February 19, 1996

Dear Parents/Guardians:

My name is Andrea Roche and I am a teacher-librarian who is attending the University of Alberta, working on my Master's in Education in the area of school libraries. I am particularly interested in how students think about their own mental processes during library research assignments. In order that I may fulfill my thesis requirements, I would like to conduct a study with students who are engaged in a library research project. This is an invitation for your child to become part of my study relating to the school library research process. Participation in this study may increase students' self-awareness of their thought processes during the research process and may increase their confidence and success when doing future research assignments.

Participation in this study will involve a few different activities. I will be asking students to complete a simple questionnaire to help me to find out about what they already know about doing research. I will also be teaching a unit on space with your child's teacher, Mrs. Smith. I will be observing students while they are carrying out the research assignment and making notes of my observations. In order that I may find out how students are thinking I will be audio-taping a few students as they discuss their research with other students. I will be asking students to keep a journal of their thoughts and experiences during the project. At the end of the project I will select a number of students and interview them about their research experiences. These interviews will also be recorded on audio tape. Students' work samples may also be used for illustrative purposes.

The data collected and analyzed during this study will be shared in my thesis. Anonymity will be preserved since the names of students, teachers, or schools will not be used in any reporting of the research. Students are free to withdraw from the research at any time without penalty. If on the day of the questionnaire or an interview your child is shy or unwilling, he/she will not be made to participate. I will be the only person who will study the questionnaires, journals, or audio-taped conversations.

Please complete the attached consent form indicating whether or not you wish your child to participate in this study, and return it to your child's teacher. If you have any questions or concerns regarding this study, please feel free to contact me at 462-4709. Thank you for your consideration.

Sincerely,

Andrea Roche
Graduate Student
Department of Elementary Education
University of Alberta

Appendix C

Criteria for Personal Journal (Diary) and Thinking Journal

Personal Journal (Diary)

- A person writes about personal activities or events. (e.g. family, friends, birthday celebrations, special events at home or at school)
 - A person writes about their feelings.
 - A person writes about their likes and dislikes.
 - A person writes about future plans.
- * A personal journal gives an honest account.

Thinking Journal

- A person writes about their goals, plans, predictions, and expectations.
 - A thinking journal may include results of an investigation.
 - A thinking journal may be a written record of what was done.
 - It may include an evaluation of how things are progressing. (Are things going well? Are there problems? What changes do I need to make?)
 - A thinking journal may include questions that you may ask yourself:
Why did I make that decision or choice?
What do I think might happen?
What do I need to do?
 - A thinking journal may give reasons why you did something.
 - A thinking journal may give reasons why you did not do something.
 - A thinking journal may tell how you intend to change something.
- * A thinking journal gives an honest account.

Appendix D

Sentence Structures for Metacognitive Aspects

Sentence Structures for Metacognitive Aspects

Planning (Prediction and Goal Setting)

Today I am going to _____.

The steps I will take are _____.

In order to _____ I need to _____.

Today I plan to _____.

If I _____ I will probably _____.

The materials I need are _____.

I will take _____ minutes to _____.

Awareness

I know I need to _____.

I see that _____.

I realize _____.

I had problems with _____.

I was successful at _____.

I achieved the following goals: _____.

Self-Reflection and Evaluation

Today I was successful at _____ because _____.

Today I was not successful at _____ because _____.

_____ worked really well for me.

_____ did not work well for me.

I think the reason for _____ is because _____.

Self-Regulation (Action)

I will _____ because _____.

Next time I will _____.

I need to _____ so that _____.

Instead of _____ I am going to _____.

Appendix E

Story Map Outline

**Story Map
Outline**

Characters <i>(Who ?)</i> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>	TITLE	Setting <i>(Where and when does the story take place?)</i> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
Main Conflict/Problem <i>(What is the problem?)</i> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>	Events <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>	Resolution/Solution <i>(How is the problem solved?)</i> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>

Appendix F

Thinking Journal Handout for Students

Thinking Journal: Ideas, Thinking and Learning for Research Project

A thinking journal may be kept by a scientist or a researcher.

A thinking journal includes the thinking and the learning that you are doing, connected with a project.

A person writes about their goals, plans, predictions, and expectations.

A thinking journal may include results of an investigation.

A thinking journal may be a written record of what was done, what needs to be done, what could be done, and what will be done.

- It may include an evaluation of how things are progressing. (Are things going well? Are there problems? What changes do I need to make?)

- A thinking journal may include questions that you may ask yourself:

Why did I make that decision or choice?

What do I think might happen?

What do I need to do?

- A thinking journal may give reasons why you did something, why you didn't do something, or why you should do something.

- A thinking journal may tell how you intend to change something.

- * A thinking journal gives an honest account.

Appendix G

Mrs. Roche's Plans (March 4, 1996)

Mrs. Roche's Plans (March 4, 1996)

When I go to the library today I will observe the grade five students as they are retrieving their information for their science fiction stories. As I observe the students, I will record my observations in my notebook. I know it will be difficult for me to record everything that goes on because it is a large class and I will also be helping students. I will probably have to use some shorthand techniques for myself so that I can write very quickly.

I will check to see whether or not students are at the centers where they planned to be and if they are following the plans they wrote in their thinking journals. I will also ask students any questions that I have that I think need to be answered. I will spend about 30 minutes doing all of these things.

I know all of these things will be difficult for me to do all at once. I think I may run short of time to do everything I want to do because whenever I interact with students the time goes very quickly.

When we are finished with our information retrieval session, I plan to discuss with the class how things went for them. What difficulties did they encounter? Did they stick to their plans? What successes did they have? I know other questions will come to me. I am so anxious to hear what the grade fives have to tell me!

Appendix H

Terry's Science Fiction Story

THAN ONE MOON. THE PLANET THAT CAUGHT MY EYE THE MOST WAS SATURN.



IT HAD SEVEN THIN RINGS CIRCLING IT. IT WAS FILLED WITH BRIGHT COLORS. I ASKED MY CREW IF WE COULD LAND ON IT, THEY ALL AGREED. WHEN WE GOT INTO THE LUNAR MODULE THAT IS USED TO GET TO AND FROM THE MOON'S SURFACE IN OTHER WORDS SATURN. I WAS THE FIRST TO STEP ON SATURN. WE COLLECTED LITTLE ROCKS IN THE ATMOSPHERE OF THAT PLANET. WHEN WE WERE DONE WE CLIMBED BACK INTO THE LUNAR MODULE AND THEN THE SPACESHIP. IT WAS A GREAT COUPLE OF WEEKS THAT WE SPENT IN SPACE, AND I'LL NEVER FORGET IT. WHEN WE SAW OUR LANDING SITE WE WENT DOWN TO IT. WHEN WE GOT OFF THE SHIP WE THEN GOT GREETED POLITELY BY JOHN AND SOME OTHER WORKERS. WE TOLD THEM ALL ABOUT OUR TRIP. FROM THAT DAY ON THE WORD SPREAD THAT WE WENT TO SPACE AND WE THEN BECAME A LEGEND.