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Strategic Reading and Writing in the Content Areas

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Teachers in school will certainly have a significant role in producing a more literate generation. Research here and abroad, which capitalized on cognitive theories, have paved the way for promising pedagogical approaches that will potentially develop the learners to become effective knowledge decoders and encoders. Several studies in this regard have been anchored on various learning strategies at the learners' disposal that make them aware of ways they can best approach their learning. The same studies affirmed that learners can be developed intellectually if they have learned to use a repertoire of strategies to accomplish a learning task.

One significant mission of every educator is to help instill in the learner the right attitude that learning is a lifetime task requiring a self-directed process. Thus, learners should be provided with skills that will empower them to adapt and respond to changing demands and make them continue learning independently even after they have left formal schooling. In the area of language teaching, much attention should be given to make learners aware that they will have to go on learning the language autonomously in order to independently manage and take control over the learning process.

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Metacognitive Strategies (MCS) and Reading Comprehension

Language practitioners are now becoming aware of the favorable contributions brought about by the cognitive studies on language learning. Empowering learners through the "development of a strategic reading program" has been strongly advocated by Hermosa (1993) underscoring the urgent need of equipping them with the needed strategies "before literacy can empower them." In the face of today's emerging reality, she notes that a good number of those from economically disadvantaged groups with minimal literacy can hardly make use of their literacy skills to meet the complex expectations of the modern world.

Recent studies in language teaching deal on the application of metacognitive strategies in the development of comprehension and then eventually, in the improvement of the learners' writing competence. Metacognitive strategies refer to the processes that enable one to anticipate or plan for a task, determine how successfully the plan is being executed, and then evaluate the success of the learning and the plan after learning activities have been completed (Chamot and O'Malley, 1994). The metacognitive strategies include planning, monitoring and evaluating learning activities which are all necessary for ensuring success in school and in the learners' future workplaces. To a greater extent, the knowledge the learner has about his or her learning system, and the decisions he needs to make about how to act on information coming into the learning process is a very significant consideration for academic success in which most learners have so far failed to cultivate.

Tonjes (1991) pointed out the parts that constitute metacognitive skills as applied to reading: (1) reading for meaning which can be called comprehension monitoring and (2) reading to remember which requires knowledge of selecting appropriate strategies, tasks and goals.

Owing to the urgent demand to develop the comprehending and composing skills of learners today, there is a need to explore the extent to which metacognitive strategies training may possibly address this problem. Thus, investigations on the learning strategies used by learners initiated by the earlier forerunners as well as the more recent investigations by Oxford and those of O'Malley and Chamot on metacognitive strategies have all motivated recent studies reviewed in this study.

The study of Breena (1995) examined the metacognitive strategies of five children, four to six years of age, who were reading fluently prior to grade one.

The study judged fluency in terms of the children's ability to conduct meaningful reading with relative smoothness. Conclusions drawn from this study revealed that each of the children used preferences for certain strategies which practically facilitated meaningful understanding of their reading materials.

Barrido's (1992) study also revealed that metacognitive strategies such as self-monitoring, self-evaluation and pre-planning were used sparingly by both teachers and pupils across groups of four ethnic schools in the province of Bukidnon.

In addition, Campbell's study (1994) emphasized the concept that autonomy can help secondary reading students to become better readers and users of text. While Breena's findings imply preferences indicated by learners in their use of strategies, this research indicates that many students in content areas do not know how metacognitive strategies can be implemented. Campbell provides practical suggestions for helping readers become autonomous which include modeling, risk-taking, time allotment, and purpose for reading. Modeling of MCS is likewise strongly recommended by Smith (1990)' Cohen (1985) and Jolley (1985).

A related index of metacognitive development with regard to task is the reader's ability to accurately predict his or her performance on the task. This has been the finding of Collins (1994) who likewise suggested an additional category of metacognitive knowledge and control involving knowing how to remedy comprehension failure. Study strategies, according to Collins' study, are important in reading to learn and can be applied to enhance text processing. A final category of metacognition in reading to learn is the awareness of the learner of his or her own characteristics such as background knowledge, degree of interest, skills, and deficiencies. It is worth-noting in this study that learner characteristics, like texts, tasks, and strategies, are age and experience-dependent and that awareness of metacognitive skills can be gleaned through instruction which is likewise implied in Campbell's findings in the attempt to develop autonomous learners.

Jo (1993) pursued a study that investigated two types of instructional design strategies, hints and learner control, that can be used to enhance metacognitive strategies in problem solving. Hints provide guidance that can lead learners to the correct solution, as they provide information, the stimulus for accurate problem-solving and cognitive support. On the other hand, learner control provides learners with opportunities to analyze their own comprehension and needs and to use instructional components according to analyzed needs. Findings in this study revealed that the metacognitive strategies acquired through instruction supported by hints and learners control may be those that are transferred to other contexts and facilitate further learning activities. In addition, Jo found that as

learners increase their confidence, they may attempt to modify and improve their own metacognitive strategies even when they are not required.

Toriyama (1993) investigated whether a classification scheme for learning strategies used in ESL instruction is applicable to strategies used in learning Japanese as a second language. Four metacognitive strategies were examined (directed attention, selective attention, self-monitoring, self-management). Subjects were 30 students of Japanese enrolled in a college summer language school and performing at three proficiency levels (beginning, intermediate, advanced). They answered a questionnaire concerning their use of eight reading strategies (inferencing, keyword method, grouping, resourcing, transfer, elaboration, imagery, deduction). Results of this study indicate patterns in the use of metacognitive and cognitive strategies. Students predominantly reported using inferencing most frequently and resourcing next most frequently. Lower-level students used more imagery and elaboration than higher-level students. Pre- and post tests indicated that advanced students showed much smaller achievement gains per strategy used than did intermediate students. The study concludes that a strategy classification scheme based on the distinction between cognitive and metacognitive strategies could be useful in linking specific learning tasks with cognitive strategies and instructional level. A similar conclusion reached earlier by Jo (1993) stressed MCS use to facilitate learning activities in specific tasks.

An investigation was made by DiGisi (1992) which revealed that the central focus in the study of metacognition is readers' recognition of what they know about a topic, realization of what they do not understand while reading, and to knowing how to remediate any discrepancies in their understanding. DiGisi's study provides significant insights to content-based language teaching especially as science learners are often subjected to cognitively-laden tasks in the classroom. Preparing them to tackle their content-area tasks through MCS intervention will somehow make them more confident to succeed in their academic pursuits. There is reason to believe that if science learners are made aware of MCS, their learning will be maximized and facilitated. Outcomes of this study revealed a relationship between metacognitive strategies and learning science in general. The study also showed the effects of preconceptions and misconceptions on the comprehension of science and methods of affecting conceptual change in students at all grade levels. The relationship between problem-solving in science activities and problem-solving in science reading, the effective use of text-processing strategies for students at each grade level, and enhancement project directed toward improving scientific literacy were likewise investigated.

In the studies of Piper (1992) and Tregaskes (1989), an intervention program in the sixth grade social studies was implemented to increase reading comprehension levels of average ability students in a large urban school district. Five metacognitive strategies were employed by Piper to improve understanding of the adopted textbook, namely: outlining, sentence summaries, self-interrogation, the KWL (derived from the phrases: What we know, What we want to Find out, and What we learned) and discourse as a mode of inquiry. Results indicated improvement in reading comprehension skills and that instruction in the five metacognitive strategies improved the target group's reading comprehension abilities. It can be inferred from this study that improvement in reading comprehension is possible with explicit instruction of MCS.

The use of advance organizers along with metacognitive strategies in the learning of the content material of high school learners was the focus of Groller's (1991) study. She found out that using metacognitive strategies leads to significantly higher reading scores than the use of advance organizers alone or merely reading an introductory passage. In addition, her study confirms that the benefits increase as the students practice using the strategies. Like Piper's study, Groller affirms the significant role of MCS training in enhancing the reading comprehension of learners.

Results from an experiment with 28 experimental and 28 matched control college students taking a 13-week computer science course was conducted by Volet (1991). This study supports the use of modeling and coaching students in metacognitive strategies to enhance learning. It concluded that the instructional method had significant long-term and short-term effects on cognitive and affective learning outcomes.

In her study, Garcia (1991) examined the effect of different levels of autonomy upon intrinsic goal orientation, task value, self-efficacy, test anxiety, use of metacognitive strategies, and performance in the college classroom. Study participants were 365 college students from 4 institutions in 10 classrooms: biology; 3 English and 4 social science classes. Study findings revealed clear differences between the three types of classrooms on end-of-term mean levels of intrinsic goal orientation, task value, and self-efficacy, with autonomy showing a facilitative effect on these construct. Metacognition was only slightly, but positively, related to autonomy. In addition, neither test anxiety not performance seemed to be related to classroom experiences of autonomy. Both intrinsic goal orientation and autonomy were significant main effects on end-or-term task value; and intrinsic goal orientation and autonomy seemed to have an additive relationship with re-

gard to task value. Intrinsic goal orientation, but not autonomy, was related to differences in end-of-term levels of metacognition and self-efficacy. The results indicate that the effects of autonomy are more closely related to motivation than to actual performance.

Addressing the development and use of self-regulating comprehension strategies in poor readers was the concern of Nicaise's (1993) study. The operating assumptions that guided this study were that poor readers suffer comprehension failure because of (a) a lack of awareness (metacognition) during reading, (b) ineffective strategy use, and (c) poor self-esteem. The primary research question addressed in this study concerned the efficacy of a comprehensive reading treatment intervention as delivered to college-level students who had reading comprehension difficulties. The focus of treatment was to increase each student's metacognitive awareness while reading and to provide the student with practice using strategies that expert readers use during reading. Major findings in this study revealed that all study participants improved on four explicit reading skills and made considerable improvement in reading comprehension. In addition, all study participants found the training program to be highly satisfying and all reported considerable improvements in their academic self-efficacy.

How learners gain an understanding of and control over the task of reading is the question that was examined in the study conducted by Winser (1992). A related question is whether there is any pattern of development over a broad age range, from early school years to adulthood. A final issue that was investigated was the effect metacognitive processes may have on reading processes. The correction patterns and protocols analyzed revealed extensive evidence of reader's awareness of and control over their reading. Younger readers were not significantly less aware than older readers, but they were less proficient, were less flexible and less capable of utilizing appropriate strategies to remedy comprehension problems. It was shown that there was an important link between metacognition and reading. Finally, there was a significant change over time in readers' understanding of language which was strongly related to their reading proficiency.

Craig and Yore (1992) focused on examining children's declarative procedural and conditional knowledge of science text and science reading. They interviewed a random subsample of 52 subjects from a sample of 500 students who completed a survey instrument of a larger study. Interviews were conducted after students had completed a 63-item survey instrument designed to determine their metacognitive knowledge of science reading and science text. Results, among others, indicated that good readers' metacognitive knowledge was generally higher

than poor readers.

Unskilled readers can become skilled learners of whole text if they are given instruction in effective strategies and taught and guided to monitor and check their comprehension while reading. This is the result of the study done by Cohen (1985).

Shih (1992) underscored the use of several kinds of metacognitive knowledge in promoting effective study. These are knowledge of the criterion tasks and what needs to be studied (task awareness); knowledge of how best to process the text for learning, including what to focus attention on, how to subsequently encode the information attended to, and how to retrieve the information required by the criterion task (strategy awareness), and self-knowledge about and to what extent one has learned the materials (performance awareness).

In addition, Carrell (1988) did a study on the role of metacognitive strategies and the conception of reading in the reading comprehension of adult native speakers of Spanish. Findings of the study revealed that some second language readers may need relatively more help with basic reading skills or second language skills to succeed in second language reading. Formal metacognitive instruction for monitoring or regulating comprehension or for developing effective and efficient reading strategies is recommended.

An experimental study was made by Dixon (1990) to determine the metacognitive reading skills employed by learners prior to instruction and after they were formally taught. Also investigated in this study was the effect of MCS instruction on the improvement of reading comprehension in less skilled readers. Findings, among others, show that metacognitive reading awareness signficantly increased after ten weeks of instruction. Years away from secondary education did not significantly affect changes in the students' metacognitive startegies awareness. Instruction in metacognitive reading skills significantly improved comprehension as measured by college board reading comprehension tests. Evident in this study is that MCS reading instruction can contribute largerly to the development of the learner's reading comprehension. This present study tries to find out if low reading proficiency learners in the physical therapy program can be helped in improving their reading comprehension after they were given formal instruction and modeling.

A study of Lee (1990) investigated whether first grade students could be taught metacognitive strategies to solve analogies. Subjects, 34 first grade students randomly assigned to two groups equal in gender, ability and urban or rural geographic location, were pretested in their ability to solve analogies. The experi-

mental group spent 40 minutes per day for 10 days in direct instruction in analogy-solving strategies. Posttests were administered 2 weeks after the pretest. Results indicated that students in the experimental group were significantly more adept at finding the special relationship involved int he analogy as well as in utilizing a common language to help in its solution. Results also indicated an increase of use of metacognitive strategies by students.

The foregoing studies reviewed unanimously support the positive contribution of MCS instruciton on the reading comprehension of the learners.

Metacognitive Strategies and Writing

Burgos (1993) studied the metacognitive processes of non-native English-speaking students performing two writing tasks through the analysis of their verbal protocols in order to investigate whether L2 writers who received higher holistic ratings demonstrated different patterns of metacognitive processing from 12 writers who received lower holistic ratings. Think-aloud data were collected from eight non-native English-speaking students of high school age. The subjects were native speakers of six different languages who had spent an average of 3 to 3.4 years in the United States. The results of the study showed differences between the patterns of metacognitive processing of the higher scores and the lower scorers and the lower scorers on each type of task. For the report task, the higher scorers were primarily concerned with organizing the material while the lowers scorers verbalized a realization that they needed frequent rereadings of the task in order to get more information. For the persuasive essay task, the higher scorers were concerned with deciding what to write based on the type of the writing required by the task. The lower scorers realized that they did not know how to proceed to the task.

A study of Peck (1989) has examined whether students could make more significant revisions in their writing if they were prompted to examine and improve their essays or they were asked to transform their prose into an interpretative essay with a clear purpose. Results indicated that students demonstrated different levels of metacognitive awareness and control over the revision process.

Learner Strategies

The theories and researches done in the field of cognitive science have been responsible for the studies that examined how learners approach their task

of learning a second language. These studies were motivated by the current understanding on how the human mind functions to carry out learning which Hunt (1982) refers to as "a systematic inquiry into our thinking selves... a discipline devoted to exploring how our minds work." The most basic assumption is that humans are processors of information which means that man is capable of processing information as soon as it comes in through his sense receptors.

Earlier studies on learner strategies concentrated so much on discerning what good language learners claim they do to learn a second or foreign language, or, in some cases, "are observed doing while learning a second or foreign language" (Wenden, 1987).

In 1966, Carton published the findings of his study entitled, "The Method of Inference in Foreign Language Study," where he aptly noted that there are differences in the way learners make inferences including their ability to construct "valid, rational, and reasonable inferences." In addition, he pointed out that "tolerance of risk would vary with ability to make good inferences." He argues that learning a language is a process that engages a learner into a short of "problem-solving" that requires him to bring in his past understanding and experiences as well as his "knowledge in the processing of language."

In 1971, Rubin pursued earlier findings of Carton and the learning theory that evolved when she began her researches that sought to find out the strategies used by successful learners. Her assumption was that "once indentified, such strategies could be made available to less successful learners." Her study showed the following variables as present in good language learners: learner psychological characteristics (risk-taking, tolerance for ambiguity and vagueness, willingness to appear foolish), learner communication strategies (use of circumlocution and gestures), learner social strategies (seeking out opportunities to use language) and learner cognitive strategies (guessing/inferencing; practicing; attending to form by analyzing, categorizing and synthesizing; and monitoring) up to good language learners. She also classified these strategies as those that "contibute directly to learning (i.e., clarification/verification, monitoring, memorization, guessing/inductive inferencing, deductive reasoning, and practice) and those that may contribute indirectly to learning (i.e., creating opportunity to practice and use of production tricks).

Naiman, *et. al.* (1978) did a similar research, concentrating on personality traits, cognitive style and strategies commonly employed by successful learners. This "initial frame of reference" was derived from Stern (1975) who provides a listing of ten (10) strategies necessary to attain second language competence On the basis of Naiman's interviewee's statements, these were further decreased

to five "general strategies and related techniques." The list enumerated the following characteristics of good languate learners:

1. actively involve themselves in the language learning process by indentifying and seeking preferred learning environments and exploring them.
2. develop an awareness of language as a system.
3. develop an awareness of language as a means of communication and interaction.
4. accept and cope with the affective demands of L2.
5. extend and revise L2 system by inferencing and monitoring.

Simultaneously, Wesche (1975) completed her dissertation on the "learning behaviors of successful adult language students" in the Canadian Civil Service. Wesche found strategies used by these students as similar with those of Rubin's and Stern's subjects. Her findings, according to Wenden (1987) had brought to light the following: (1) there was a greater variety and quantity of learning behaviors pursued by those who improved most rapidly, and (2) many of the observed learning behaviors occcurred together.

Wong-Fillmore (1976) pursued studies along this interest using five Chicano students. She found that by using a few well chosen formulas, learners could continue to participate in activities which provide contexts for the learning of new materials. The research gave strong evidence of the "link between strategies which contribute indirectly to learning (social strategies and communication strategies) and learning strategies (inferencing through what is known and strong through associations and context)."

Four strategies classified under two categories as functional strategies, involving inferencing and functional practicing and formal strategies, i.e., monitoring and formal practicing were the focus of Bialystok's (1979) study. Results indicated favorable effects on achievement in certain kinds of tests, and that only the functional strategies significantly modified performance for all tasks.

Identifying the communication strategies used by second language learners to carry on a conversation was the focus of Tarone's (1981) study. Among these strategies include word coinage, mime, circumlocution, appeal for assistance, approximation, silence or hesitation, questioning repeat, approximating the speakers's message, and explicit indication of comprehension.

Using the introspection "think aloud" method, Hosenfeld (1977) reports on the reading strategies of successful and unsuccessful second language learners.

Hosenfeld's study revealed that successful readers use some form of contextual guessing based on the process of inductive reasoning. In addition, the same study reported on a "metacognitive strategy in which the student evaluates thinking by assessing the appropriateness on the logic of a guess." Hosenfeld's first attempt to train learners in the use of strategies for efficient reading was reported in her 1979 article.

The use of strategies for developing vocabulary skills has been investigated by Cohen and Aphek (1981). In 1980, they also explored the role of mnemonic associations in strengthening the retention of vocabulary for a long time in the learner's memory. They found that in most instances, students tried to memorize words and that eleven categories of associations were identified as being utilized by students. In their tentative conclusion, they pointed out that the use of such strategies facilitated the retention of vocabulary overtime. The proponents also identified some strategies which prevented learning: poor memory techniques, poor inductive inferencing strategies and poor deductive reasoning.

Several studies in the seventies made significant contributions to the present understanding of language learning. Most of the research focused on identifying strategies which contribute either directly or indirectly to learning.

The work that heavily contributed a new dimension to our understanding of learner strategies has been that of Wenden (1982, 1986). She underscores the importance of metacognitive knowledge in second language learning and identified five areas, viz: (1) the language (2) student proficiency (3) outcome of student's learning endeavors (4) the student's role in the language learning process, and (5) how best to approach the task of language learning. This study contributed important insights on metacognition in second language learning, namely: what learners know about their L2 learning (metacognitive knowledge) and how they plan it (a regulatory process).

Building on what Wenden has found, Chamot and O'Malley (1990) established a clear distinction between cognitive and metacognitive strategies, the latter being "the regulatory processes by which learners plan, monitor and evaluate their learning." Their investigation on this regard made use of beginning and intermediate-level high school ESL students classified by teachers as having high academic ability. In this study, the researchers interviewed students and asked them to describe special methods or "tricks" they used for various language learning activities selected to represent their classroom instruction. The finding revealed that "learners were very much aware of their own mental processes and could describe these processes in some detail." They added that although "learn-

ers are able to describe their own thinking and learning strategies, most of their teachers were unable to describe how their students learned what was taught to them." They also used information from the student interviews to describe, classify, and analyze strategies used by effective and less effective language learners for different types of language tasks, both within and beyond the classroom. One important finding was the students often used combinations of strategies in complex and interesting ways.

An experimental study was pursued by Chamot and O'Malley (1990) drawing on the strategies they identified as being used by the learners. They tried to find out if the strategies employed by effective students could be successfully taught to other ESL students in a classroom setting. Their study revealed favorable result pointing out the possibility for the latter group to be taught strategies of the high performing students through instruction, and that the use of learning, strategies can improve performance in language learning tasks.

Their subsequent study highlighted the role of teachers in discovering the strategies employed by learners in approaching learning tasks and in expanding the students' repertoires of strategic approaches by involving them as "collaborators in developing the knowledge and processes needed to attain common goals." This insight gave the present study direction in teaching learners metacognitive strategies and at the same time, expanding or enriching what they have previously learned through actual instruction. In a way, learners are developed to regulate and take control of their own learning pursuits. Nevertheless, there is reason to believe that learners can profit most from instruction in learning strategies. Table 1 show a list of metacognitive learning strategies as outlined by O'Malley and Chamot (1990).

Oxford (1992) also explored the contribution of metacognitive strategies on language learning. She refers to learning strategies as "specific actions, behaviors, steps, or techniques that students (often intentionally) use to improve their progress in developing L2 skills." She underscores the fact that "these strategies can facilitate the internalization, storage, retrieval, or use of the new language since they are tools for self-directed involvement necessary for developing communicative ability." She differentiates two major groups of learning strategies, namely: direct and indirect. Direct learning strategies include: memory, cognitive and compensational while indirect learning strategies include: metacognitive, affective and social. In her conclusion, Oxford strongly believes that the appropriate use of language learning strategies results in improved L2 proficiency overall, or in specific language skill areas.

Table 1. *Metacognitive Learning Strategies and Their Definitions*

Metacognitive strategies, involve thinking about the learning process, planning for learning, monitoring the learning task, and evaluating how well one has learned.

1. **Planning:** Previewing the organizing concept or principle of an anticipated learning task (advance organization); proposing strategies for handling an upcoming task; generating a plan for the parts, sequence, main idea, or language functions to be used in handling a task (organizational planning).

2. **Directed attention:** Deciding in advance to attend in general to a learning task and to ignore irrelevant distracters; maintaining attention during task execution.

3. **Selected attention:** Deciding in advance to attend to specific aspects of language input or situational details that assist in performance of a task; attending to specific aspects of language input during task execution.

4. **Self-management:** Understanding the conditions that help one successfully accomplish language tasks and arranging for the presence of those conditions; controlling one's language performance to maximize use of what is already known.

5. **Self-monitoring:** Checking, verifying, or correcting one's comprehension on performance in the course of a language task. This has been coded in the think-alouds in the following ways:

   a. **Comprehension monitoring:** checking, verifying, or correcting one's understanding.
   b. **Production monitoring:** checking, verifying, or correcting one's language production.
   c. **Auditory monitoring: using** one's "ear" for the language (how something sound) to make decisions.
   d. **Visual monitoring:** using one's "eye" for the language (how something looks) to make decisions.
   e. **Style monitoring:** checking, verifying, or correcting based upon an internal stylistic register.
   f. **Strategy monitoring:** tracking use of how well as strategy is working.
   g. **Plan monitoring:** tracking how well a plan is working.
   h. **Double-check monitoring.** tracking across the task, previously undertaken acts or possibilities considered.

6. **Problem identification:** Explicity identifying the central point needing resolution in a task or identifying an aspect of the task that hinders its successful completion.

7. **Self-evaluation:** Checking the outcomes of one's own language performance against an internal measure of completeness and accuracy; checking one's language repertoire, strategy use, or ability to perform the task at hand. This has been coded in the think-alouds as:

   a. **Production evaluation:** checking one's work when the task is finished.
   b. **Performance evaluation;** judging one's overall execution of the task.
   c. **Ability evaluation:** judging one's ability to perform the task.
   d. **Strategy evaluation:** judging one's strategy use when the task is completed.
   e. **Language repertoire evalation:** judging how one knows of the L2 at the word, phrase, sentence or coinage, or concept level.

Source: From Chamot, Kupper, and Impink-Hernandez (1988b, pp. 17-19).

The classifications provided by O'Malley and Chamot and those by Oxford bear similarities. However, the former grouping of metacognitive strategies as outlined by O'Malley and Chamot is the one employed in this study.

In most studies reviews, the frequently used techniques for assessing students' L2 strategies include informal or formal interviews, group discussions, language learning diaries, dialogues, journals between student and teacher, open-ended surverys, structured three-or-five-point surveys of strategies are internal and thus, invisible to observers Brown (1989) and Harlow (1988) conclude that much learning strategy research depends on learners' willingness and ability to describe their internal behaviors, both cognitive and affective.

The study of Harmon (1993) suggests that knowledge permits an individual to engage in higher levels of reflective thinking or metacognitive strategies. According to this study, with knowledge, the problems can be represented more completely which allows for more efficient and effective monitoring of the problem solving process. It appears from this study that the reflective thinking processes, which encourage elaboration on a problem, are instrumental in producing the most efficient problem solving behaviors. The findings suggest that these metacognitive strategies need to be specifically taught to students and that the use of examples of problem solutions facilitates transfer to analogical problems.

A locally-conducted study on the strategies employed by secondary level teachers to develop cognition and metacognition among fourth-year high and low-ability science students (Foronda, 1990) focused on the types of questions and questioning strategies, students' responses, and communication strategies used to make input comprehensible. The indicators of critical or ordinary thinking were derived from the students' responses. The study revealed that mentors seldom move their students from cognition to metacognition and that they tend to ask more low-cognitive level types of questions in low-ability classes. As to learning strategies for cognitive development, a greater number of responses manifested ordinary thinking in both ability groups although there was greater evidence of critical thinking in the high ability group. Both groups employed various learning strategies but those commonly used were translation, code-switching and language shift. Reformulation strategies were observed to be seldom employed by the high ability group despite the fact that questions asked them were cognitively demanding than those used on the other group. Reformulation strategies were commonly resorted to by the subjects in Manalo's (1990) study which is contradictory to Foronda's findings whose subjects did not employ the use of reformulation strategies.

The concepts cited collectively lend support to recent investigations that put emphasis on the development of the learner's writing competence through the strategic reading program. The importance of developing these two macroskills i.e., reading and writing, is inevitably called for in the face of today's fast industrializing world whereby eventually, learners shall be left to take control of their own learning especially as they enter the real-world in the workplaces and in the academe.

Finally, the above concepts underscored the need for learners to become self-motivated learners who can make informed choices that come mostly through wide reading and exposure to wide sources of view points. It is needed for learners to be able to exhibit understanding through writing for the benefits of others in the field. Making learners become willing readers of the various source of information and developing in them a positive they may encounter in and outside of the school implies that they, too, must have established a level of interest in reading and a favorable attitude for reading and writing prior to becoming autonomous.

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