Language Teaching and the Enhancement of Higher-Order Thinking Skills**

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Abstract:

The last three decades have seen a growing educational interest in thinking and the ways it can be enhanced in the classroom. The current interest in teaching thinking skills has been provoked by the onset of the Information Era, supported by recent advances in cognitive theory, and international comparisons of students' higher-order cognitive skills. As a result, the teaching of thinking skills is slowly becoming an integral part of the school curriculum. What used to be the content taught to only elite students is becoming part of the curriculum used to teach all students. This paper will discuss the various issues involved in teaching higher-order thinking skills in language classrooms. Some will argue that the proper teaching of a subject, is equivalent to, or sufficient for, promoting higher-order thinking. However, there seems to be sufficient data to suggest that efforts must be taken to explicitly infuse thinking into content instruction. The possibilities of using the four basic language skills to enhance the acquisition of higher-order thinking skills by students will be dealt with in this paper. This paper will also focus on some of the factors which need to be addressed seriously and systematically, for the teaching of higher-order thinking skills in language classrooms to be successful. These factors include teachers' knowledge, skills, and attitudes, continuous professional development of teachers; framework for teaching thinking; and the terminology and taxonomy needed for teaching thinking. This paper is prepared largely from data obtained for a research on teaching higher-order thinking skills in language classrooms.

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Introduction

Do we really need to teach students to think? Isn't thinking a natural consequence of teaching and learning in general? Do not people think spontaneously without being taught? These are some of the important questions which need to be addressed in the area of teaching thinking. We, indeed, do think without being taught how to think. We classify, analyze, generalize, analogize, deduce, induce, form and test hypotheses, make decisions, and solve problems. We do these things long before we encounter organized efforts to teach us how to think effectively.

It does not follow from the fact that we think spontaneously that we think as effectively as we might (Nickerson, 1988). And the evidence regarding our limitations as thinkers and the various ways in which our thinking commonly goes astray is well documented (Goleman, 1995; Nisbett & Ross, 1980; Tversky & Kahnerman, 1974). When we say we want to teach students to think, what we really mean is that we want to improve the quality of their thinking. We want to teach them to think more deeply, more consistently, more productively, and more effectively than they otherwise might.

It is true that the last three decades have seen a growing educational interest in thinking and the ways it can be enhanced in the classroom (Rajendran, 1998a; Marzano, 1991; Resnick & Klopfer, 1989). The current interest in teaching thinking skills has also been intensified by the onset of the Information Era, duly supported by recent advances in cognitive theory (Adams, 1989), and international comparisons of students' higher-order cognitive skills. However, the teaching of thinking has been in different forms in schools for a long time. The cultivation of critical reasoning ability has been an objective of teachers of philosophy, logic, and rhetoric, among other subjects, for centuries. Aiding students to use their minds more effectively is presumably a major reason for teaching literacy, numeracy, and other basic skills.

This paper aims to investigate the issue of language teaching and the enhancement of higher-order thinking skills. Investigation on teaching thinking in general has, indeed, been a recent phenomenon among researchers for a number of reasons (Greeno, 1989). This, inevitably, has resulted in making the research on teaching of thinking skills in specific subject areas an under-explored area.

This paper will investigate the possibilities of using the four basic language skills to enhance the acquisition of higher-order thinking skills by students. This paper will also focus on some of the factors which need to be addressed seriously and systematically for the teaching of higher-order thinking skills to be successful in language classrooms. The factors include teachers' knowledge, skills, and attitudes; continuous professional development of teachers; the framework for teaching thinking; and the terminology and taxonomy needed for teaching thinking. This paper is prepared largely on data obtained for a research on teaching higher-order thinking skills in language classrooms.

Teaching Thinking Skills

There is great interest among researchers and educators, at present, in the teaching of thinking (Resnick, 1987; Nickerson, 1988). As Resnick (1987) suggests, there have been recent attempts to include the teaching of thinking skills in all subjects to all students. That brings along the need to teach higher-order thinking skills in language classrooms which seems very pertinent for this investigation. There are reasons why teachers should improve students' thinking as they build their language abilities. First, teaching strategies that strengthen thinking competencies increase language arts achievement (Collins, 1991). It is a myth that as people mature, their thinking and reasoning naturally escalate. Unfortunately, critical and creative thinking abilities do not develop automatically. Adults who were not taught to think critically and creatively exhibit cognitive abilities that are no more advanced than the thinking processes they used when they were in the sixth grade (Gardner & Hatch, 1989).

Therefore, it becomes important to teach thinking skills explicitly besides the school subjects. In this respect, it is important to review how we define and teach the respective school subjects in relation to whether we teach students to think critically or creatively. To be considered literate, for example, seems to require that students know more about how to think; not just how to read.

In relation to this, Hiebert and Raphael (1996) reviewing different definitions of literacy suggest that it is the first step in the empowerment of the mind, albeit a crucial one. Langer(1991) also argues that literacy can be viewed in a broader and educationally more productive way, as the ability to think and reason like a literate person. In this respect, she proposes that, the schools need to understand the ways of thinking that are involved in a particular society's uses of literacy and to use approaches to literacy instruction that will ensure that these ways of thinking become an intrinsic part of the school's context. As such, the listening, speaking, reading, and writing components of language instruction should aim to improve the higher-order thinking abilities of the students.

Students must learn to identify problems in, and be able to reason effectively with printed information. For example, as Beck (1989) states,

> Reading and language arts are the perfect vehicle for developing higher-order thinking because literature - perhaps more than any other source of information - provides powerful models of problem-solving processes. It is full of characters who engage in effective and ineffective attempts at solving problems, who use incisive of fuzzy reasoning, and who rely on adequate or inadequate evidence... What is needed is to move the activities that involve higher-order thinking into the core of our lessons, to move our concern toward developing higher level thinking into the mainstream of instruction (pp. 680, 682).

To help students develop higher-order thinking abilities, teachers need to delegate more time to instruction dealing with high-quality thinking with printed and spoken material. Implications of these suggestions are that teaching in the language arts classrooms should go beyond the mere teaching of listening,

speaking, reading and writing. Efforts should be made to acquire the critical and creative thinking skills, as Langer (1991) suggests, “the current era requires that students acquire the kinds of critical thinking skills that are needed to use the communication devices and technologies we meet on a daily basis in our everyday living and in entry-level jobs” (p. 12).

It is not to suggest that teachers are not using any strategies or techniques which promote thinking among students. Teachers may be, consciously or otherwise, using many strategies to enhance the thinking of students. These strategies cut across a wide range of cognitive processes and can be employed in a wide range of situations. However, as powerful as the strategies are, an even more powerful set of strategies may be underutilized (Marzano, 1993). It seems that educators have taken great strides in their efforts to enhance the thinking of students, yet the journey has only begun.

It appears to me that, as Nickerson (1988) suggests, in spite of numerous vigorous attempts by various reformers to make thinking a primary focus of education and to effect whatever changes in educational practice would be in the interest of doing so, the educational system, as a whole, has been remarkably resistant to these efforts. There seems to be a legitimate question as to whether the educational system, as a whole, or society in general, has ever really accepted the idea that helping students to become independent thinkers should be a primary educational goal (Paul, 1985). At least until there is a general consensus among educators on the need to make teaching thinking skills as a primary educational goal, all efforts to teach thinking skills will only bring limited success.

Teaching Thinking Skills in Language Classrooms: Isn’t the Teaching of Four Language Skills Equivalent to the Teaching of Thinking Skills?

There seems to be a lack of literature in the area of teaching thinking although in the past 30 years, there has been major scientific progress in the psychology of thinking concerned with performance on specific tasks, and much less in the psychology of critical, productive, higher order, and creative thinking (Greeno, 1989). Greeno suggests that, research on the topics of productive, higher order, critical, and creative thinking has not been an integral part of the major success of cognitive and developmental psychology. As such, making a logical connection between the development of thinking abilities of an individual and the teaching of thinking skills, which should cater for it, becomes an immense task.

Developing Students’ Thinking Processes In Language Classrooms

Since this study attempts to investigate the teaching of higher-order thinking skills in language classrooms, it seems important to explore how does the teaching of higher-order thinking skills relate to the teaching of language arts. It is the view of some psychologists that thinking development should precede

language instruction. A leader of this position is Jean Piaget (Duckworth, 1987; Piaget, 1963). Piaget professed that students learn language by translating thoughts (notions, natural inclinations, and tendencies) into words. He emphasized the need for teachers to deliver instruction that was rapidly paced; and encouraging students to explore materials and discover labels and names for concepts they found (Duckworth, 1987).

Piaget (1963) supported this theoretical framework with evidence that young children learn to talk through their own initiative and curiosity, without formal instruction if they are immersed in a language-rich environment. In a period of only three or four years, for example, children acquire a vocabulary of 5,000 words, and internalize major grammatical rules of their spoken language. Piaget proposed that schools should use immersion and exploration as learning tools throughout the high-school years.

On the other hand, some psychologists believe that thinking processes should be developed as the language labels of a concept are presented. Leaders in this area of research are Bruner (1986), Kozulin (1990), and Vygotsky (1978). Vygotsky theorized that through the use of specific words and language patterns, thinking is shaped. He and other psychologists reason that the degree and direction of thinking will be related to the breadth of one's language development. Thus, if teachers teach language arts from this perspective, they will develop thinking simultaneously with language. Teachers will assist students to translate ideas, feelings, and experiences into words, as soon as a mental image appears. At the same time, the accuracy and specificity of this translation will be determined by the depth and precision of thinking.

When students state their thoughts aloud, for example, they may realize that their thinking is not clear. As a result, they may call upon a novel example to state the point in a slightly better way, and thus evolve a deeper sense of it for themselves. When students have to convince their classmates, they will provide themselves with the reasons for the thinking they did. Likewise, when classmates misunderstand parts of an argument, they may think through it again, which improves and advances their understanding and communication.

In this respect, one of the important debates is whether thinking is the same across disciplines. Whether all thinking abilities are specific to disciplines, or whether the truth lies somewhere in between. McPeck (1981) contends that generalizable thinking skills do not exist. He holds that thinking is always about a subject, so general thinking ability detached from a subject cannot conceptually exist. This is the conceptual version of the subject-specific view.

McPeck concludes that critical thinking must, therefore, vary from subject area to subject area. The empirical version of the subject-specificity view is held by many contemporary cognitive psychologists (e.g., Glaser, 1984). They hold that it is empirically unlikely that general critical thinking skills can be taught and transferred to other domains, or in other words, critical thinking is domain-specific. However, there seems to be no general consensus among scholars in the area of teaching thinking on this matter.

The same seems to go for the approaches to teaching thinking. Partly due to the reason stated above, there are at least three general approaches which

could be used to teach thinking skills (Swartz and Parks, 1994). First, we have the direct instruction of thinking in noncurricular contexts, which is often called the teaching of thinking. Teaching thinking by direct instruction means that, in a time period designated for thinking instruction, students learn how to use explicit thinking strategies, commonly guided by the teacher. Such lessons employ the language of the thinking task and procedures for doing it skillfully.

The second approach is called teaching for thinking. This approach involves employing methods to promote students' deep understanding of the content. Such methods, include using cooperative learning, graphic organizers, higher order questioning, Socratic dialog, manipulatives, and inquiry learning. While students may respond thoughtfully to the content, no thinking strategy is taught explicitly.

The third approach is the teaching of thinking skills using the infusion approach (Swartz and Parks, 1994). Infusion lessons are crafted to bring into content instruction an explicit emphasis on skillful thinking so that students can improve the way they think. Classroom time is spent on the thinking skill or process, as well as on the content. Infusion lessons feature a variety of effective teaching practices that characterizes the way thinking is explicitly emphasized in these lessons.

Whatever the approach maybe, it is important to understand the relationships between teaching knowledge, that is the language content, and teaching thinking. It is generally thought that teaching knowledge is sufficient for understanding (Perkins, 1993), and thinking. Thinking, no doubt, seems to be enhanced by the deeper understanding of knowledge. But knowledge alone is not sufficient. As Perkins (1992) argues, a deeper understanding of the knowledge forms the basis for the active use of knowledge and skills, and that should be the aim of education.

One of the ways of teaching for deeper understanding and thinking is to allow students to play an active part in the teaching and learning processes. This is also in line with what Onosko and Newmann (1994) suggest, "The best we can do is to engage in what we predict will be challenging problems, guide student manipulation of information to solve problems, and support students' efforts" (p.29).

Classroom activities that employ collaborative problem solving seem to have the potential for teaching children how to deal with complex tasks and to work with and learn from each other (Johnson, Johnson & Holubec, 1990). One would expect that exposure to a rich array of collaborative problem-solving activities in the classrooms would help students become problem solvers as adults. For this to happen in the classrooms, the traditional telling-listening relationship between teacher and student should be replaced by one that is more complex and interactive (Prawat, 1992, pp.357).

Teaching of Higher-Order Thinking Skills In Language Classrooms

Aristotle believed that the depths of one's thinking governed the types of language one could use (Anderson, 1985). Language is fundamentally linked to thought by the manner in which information is stored (Marzano, 1991). In fact, some language philosophers (e.g., Fodor, 1975) postulate the existence of a deep level, linguistically-based abstract code that is at the root of all thinking and intention.

One cannot think in a content vacuum. Sophisticated understanding and mastery of higher-order challenges occur only through the use of knowledge in a subject or topic, whether it be consumer decision making, the design of a bridge, or critique of a theater performance (Onosko and Newmann, 1994). Of course, a subject can be taught in ways that fail to promote thinking, but thinking may not be taught apart from knowledge. Some would argue that the proper teaching of a subject, in this case the language arts, is equivalent to, or sufficient for, promoting higher-order thinking (Glaser, 1984; McPeck, 1981; Nickerson, 1988; Prawat, 1991), because it demands that students interpret, analyze, and manipulate knowledge to face new challenges within the subject and because it draws the student closer to the thinking of experts in the field. Beyond substantive knowledge of the topic, students need analytic knowledge (e.g., the structure of well-reasoned arguments, distinctions between empirical, conceptual and normative claims, criteria to judge reliability of evidence) and metacognitive knowledge (i.e., awareness and self-monitoring of one's thought processes).

We now believe that language abilities and thinking competencies shape each other (Block, 1993). Both are of equal intensity in fostering learning. Through the power of language use, the quantity and quality of students' thoughts can be improved. Through reading, writing, speaking, and listening, transitory thoughts can be transformed into lasting principles. This transformation occurs because single ideas enter the mind as cognitive entries, capable of bonding with collective categories of former thoughts.

Block (1993), further suggests that, these categorical thoughts are then stored as dense cognitive structures called schema. Each schema is the collection of learnings, experiences, emotions, and values one has about a topic. Nerve endings of schema in the brain expand in length and breadth as one discusses, writes, and reads about a concept. This depth and breadth eventually become wisdom as more and more dendrites (branches from nerve endings) are forced to intertwine (Rosenblatt, 1978; Smith, 1978). Thus, if adults and children fail to ignite students' thinking, writing, reading, speaking, and listening their wisdom is limited (Collins, 1992).

In relation to this, Gardner and Hatcher (1989) after having reviewed programs attempting to teach thinking skills state,

> the relationship between language and thinking has been a topic of debate for a long time. However, nearly every program we have considered acknowledges the importance of language facility to effective thinking in one way or another...(Students) must become an adroit manipulator of language, logical forms, computer

> programs, or other symbol systems that, in effect, can serve as vehicles for thought (p.48).

Therefore, since students' thinking abilities and language development are of equal value and influence upon the depth of their communication, teachers should develop both competencies if students' potentials are to be fulfilled. In light of this, it seems important to understand how the four main components of language instruction: listening; speaking; reading; and writing, relate to the development of thinking skills.

The importance of overt speech as a tool for enhancing thinking was evidenced in 1974 when the National Institute of Education in the United States identified overt speech in the classroom as one aspect of its research agenda. Cazden (1979) has shown that the use of oral language by both teachers and students serves to establish a classroom atmosphere that either elicits or discourages certain types of thinking. Cuing and questioning are two primary ways that teachers use overt speech to elicit specific types of thought.

Cuing involves teachers' use of overt speech to signal specific learning episodes. That is, teachers verbally signal the type of learning expected within a given period of time. Ideally students then retrieve appropriate mental scripts to match the learning episode. Elaborate coding schemes have been developed to describe the different forms of teacher language used as cues for various episodes (Mehan, 1979; Sinclair & Coulthard, 1975). Cues such as verbal advanced organizers that signal the structure of content are among the most powerful. That is, when students learn new content, the structure that information takes in the long-term memory is greatly influenced by how the teacher talks about the content (Moore, 1977). A number of studies have shown that structure of content as stored in students' long-term memory corresponds more closely to the a priori structure of the content after verbal instruction (Johnson, 1967, 1969; Johnson, Cox & Curran, 1970; Shavelson & Geeslin, 1973).

Questioning is a second way that teachers use overt speech to elicit specific types of thought. Redfield and Rousseau (1981) suggest that higher-level questions appear to be instrumental in enhancing student thinking. A subset of the research on teacher questioning is the research on teacher use of "wait time." Expanding on Rowe's (1974) original definition of wait time as pausing for several seconds after asking a question to give students time to think before being called on to answer, Tobin (1987) identified a number of different types of wait time (e.g., the pause following any teacher utterance and any student utterance, the pause following any student utterance and preceding any teacher utterance). He concluded that extended teacher wait time after asking questions should be viewed as a necessary but insufficient condition for higher, cognitive-level achievement.

Results obtained by Granato (1983) and Knickerbocker (1984) suggest that a longer wait time after questions provides students with opportunities to get involved in verbal interactions. Similarly, extended wait time has been associated with more student discourse (Swift & Gooding, 1983), more student-to-student interactions (Fowler, 1975; Honea, 1982), decrease in student confusion (DeTure

& Miller, 1985), higher achievement (Riley, 1986; Tobin, 1986) and in complexity and cognitive level of student responses (DeTure & Miller, 1985; Fagan, Hassler & Szabo, 1981).

In the case of reading, Rosenblatt's (1978) work on the transactional nature of reading has helped elevate reading to a process that, by definition, includes critical and creative thought. Perhaps the most comprehensive attempt to incorporate the high-literacy tradition, which emphasized critical and creative thinking under the general rubric of rhetorical invention, within the framework of the language arts is Moffett's "interaction" approach (1968; Moffett and Wagner, 1983). He conceptualized the "the universe of discourse" to encompass: the linguistic models of listening, speaking, reading and writing; the different forms of audience; and the egocentricity versus the exo-centricity (decentration) of the thought being experienced. The high-literacy nature of Moffett's approach is evident in its emphasis on student's creation of new products (e.g., essays, plays, poems), which implicitly demand attention to invention, arrangement, style, delivery, synthesis, extension, and other activities associated with critical and creative thought.

One of the powerful reading interventions is Palinscar and Brown's (1984) reciprocal teaching, which is fundamentally metacognitive in nature. Reciprocal teaching employs a process of cooperative question-asking between teacher and students to highlight many of the metacognition demands of reading. The teacher models the overt summarizing, questioning, clarifying, and predicting processes, which are assumed to be internal processes executed during reading, while students comment on the quality of questions, and summaries, and try to construct better ones.

After an intervention period of several weeks in which reciprocal teaching was practiced daily, middle-school students who had received instruction had higher reading performance than control groups and maintained this higher performance even after an eight-week period without instruction (Palinscar and Brown, 1984). More strikingly, noted Resnick (1987), scores on science and social studies comprehension tests given in the classroom rather than in the reciprocal teaching laboratory also rose significantly for the experimental subjects.

In terms of the relationship of writing to thinking, Nickerson has stated that: "Writing is viewed not only as a medium of thought but also as a vehicle for developing it" (Nickerson, 1984, pp. 33). It is the robust nature of the difficulty of the writing task that renders it a powerful tool for enhancing thinking. By definition, the composing process is a highly-complex cognitive task. For example, in a study of writing performance within a number of disciplines, (Perkins, 1981) found that the ability to produce final copy easily and on the first draft is rare even among professionals.

In a series of studies Flower and Hayes (1980a, 1980b, 1981) developed a model for the writing process. Although it has been criticized (Cooper & Holzman, 1983), it is still the most widely cited. As Applebee (1984) noted, it is the "most thoroughly formalized model of the writing process" (p.582). Flower and Hayes characterized writing as a set of iterative, recursive phases, which

include planning, translating and reviewing, all of which are under the control of an executive monitor. Within each phase the writer is continually weighing the effects of current decisions on those previously made. The longer the process continues and the more the quantity of written discourse increases, the more interdependency is effected. Over time the process becomes one of making decisions based on increasingly more numerous and complex conditions.

From this perspective, writing is one of the most taxing of cognitive acts because it maximizes the load of information that must be maintained in working memory during its execution. Presumably, practice in writing should enhance performance in any cognitive process in which executive control over a number of variables is a factor (e.g., some forms of problem solving); however, not all forms of writing instruction will enhance such executive control. Specifically, in his meta-analysis of writing research, Hillocks (1986) concluded that it is only when teachers plan instructional activities that result in a high level of student autonomy and interaction about the problems faced in composing that writing instruction has a powerful effect on student thinking. Hillocks referred to this as the environmental mode of instruction.

In my opinion, research in general seem to suggest that there is a strong relationship between the teaching of the four language components and thinking skills. Thinking seems to be inherent in almost all activities encompassing the four language components. However, merely planning and teaching these four language components in classrooms do not seem to guarantee the development of student thinking. Rajendran (1998a), in his investigation in language classrooms, found that all the four language components were underutilized in promoting higher-order thinking skills. As Hillocks (1986) suggested, only deliberate attempts by teachers to provide high level of student autonomy and interaction seem to have an effect on students' thinking abilities.

The Approaches, Strategies and Techniques Used

One reason teaching strategy is important is that, by adopting a certain strategy, the teacher models a certain role for students (Sternberg & Spear-Swerling, 1996). This role modeling conveys, sometimes unwittingly, implicit messages to students. If the messages are of the wrong kind, then the teaching may not only be ineffective, it may actually be harmful. In some instances, the explicit messages may even contradict an implicit one (e.g., as in our anecdote about the mathematical-methods course, or when a teacher encourages students to give their opinions on an issue and then shoots down opinion unlike his or her own).

Taking off from the contention that a major source of failure in teaching thinking could be the teaching style, Sternberg and Martin (1988) considered three different styles in which teaching can take place in classrooms. The first style is a lecture-based or didactic style. The second style is a fact-based questioning approach. The third style is a thinking-based questioning approach, or what might be termed a dialogical approach. They concluded that,

> Our observations of classrooms tell us that by far the greatest proportion of teaching takes place in Style 1, and most of the remainder of the teaching is in Style 2. Relatively little of the teaching that goes on in most classes takes place in Style 3...It would be easy merely to blame the teacher for dwelling on Styles 1 and 2 to the exclusion of Style 3, but the issue is not this simple (p. 560).

They concluded that, “Relatively little of the teaching that goes on in the classroom directly encourages higher-order thinking (p.560).” Teachers who taught these classes, however, felt that they were actually teaching for thinking. This was also true with other audience in their research. They reported that, “Virtually all teachers believe that they teach for thinking” (p.555). It seems important to note that this was also the case in the investigation involving teachers teaching higher-order thinking skills in language classrooms (Rajendran, 1998a).

The problem here is that there seems to be a clear cognitive dissonance between what teachers believe about teaching thinking and what they are actually doing in their classrooms. Although, Spear and Sternberg (1987, cited in Sternberg and Martin, 1988, p.557) have contended that one major source of failure in teaching thinking relates to teaching style, the cognitive dissonance found among teachers may be the result of assuming that ‘good’ thinking is the by-product of effective teaching and learning.

There are already many tools available to teachers to enhance the thinking of their students. In relation to this, the most frequently used classroom method of enhancing thinking is questioning, although it is only recently that we have developed a thorough understanding of the nature and use of classroom questions (Marzano, 1993). Specifically, we know that, in general, teachers ask far more questions than they are aware of. To illustrate, elementary teachers who thought they were asking 12 to 20 questions every half hour were actually asking 45 to 150 questions (Nash & Shiman, 1974). For many researchers, the ‘essential teaching exchange’ is that sequence of moves describable as ‘question-answer-comment/evaluation’ or in more abstract form, ‘initiation-response-evaluation/feedback (IRE, or IRF) (Edwards & Westgate, 1994).

There is some evidence that asking questions improves students’ comprehension and retention of content (Yost, Avila & Vexler, 1977). When questions are given after content has been presented and students are required to construct answers rather than select from among themselves, the benefits tend to be the strongest (Christernbury & Kelly, 1983). Higher-Level questions also appear to be instrumental in enhancing student thinking (Redfield & Rousseau, 1981) although there is considerable disagreement as to what constitutes higher-level questions (Fairbrother, 1975; Wood, 1977). One powerful distinction is that between recitation questions (those requiring students to simply retrieve information previously learned) and construction questions (those requiring students to construct new ideas or conclusions relative to information in long term memory).

van Zee and Minstrell (1997) examined ways in which Minstrell, one of the researchers, used questions to guide student thinking during a class discussion about measurement. They found that the reflective tosses (a reflective toss sequence typically consisted of a student statement, teacher question, and additional student statements) they used served three emergent goals. The first was the use of questions to help students make their meanings clear. The second theme was the use of questions to help students consider a variety of views in a neutral manner and the third theme was the use of questions to help students monitor the discussion and their own thinking.

To make sure they are enhancing higher-order thinking, many teachers rely on classification systems or taxonomies that differentiate the levels of thought that various questions elicit. By far the most popular system for classifying questions is Bloom, Engelhart, Furst, Hill, & Krathwohl's (1956) taxonomy. We are well aware of Bloom's six levels of cognitive processing: knowledge; comprehension; application; analysis; synthesis; and evaluation. Presumably, as one asks questions at the higher levels of the taxonomy, more sophisticated levels of thought are elicited. Unfortunately, this assumption is not supported by much of the research on the taxonomy. It has been shown that teachers have little success differentiating one level from another, specifically at the higher levels (Ennis, 1981; Wood, 1977). For example, when asked to determine whether a specific question was an example of an analysis question or an evaluation question, teachers disagreed more often than not.

Metacognitive approaches could also play an important role in enhancing thinking in language classroom. Metacognition as defined by Flavell (1976, 1977, 1978) refers to one's knowledge concerning one's own cognitive processes and products or anything related to them. Brown (1978) breaks metacognition into two components: awareness and control of the factual or declarative knowledge necessary to complete a specific task and awareness and control over the necessary processes or procedural knowledge to complete a task.

Hayes and Flower (1980) model of writing is the monitor that exerts executive or metacognitive control over the component processes. Key to this metacognitive control of the task is goal setting. Specifically, writers translate high-level goals into subgoals. The result is that subgoals tend to pile up creating a potential overload on working memory (Flower & Hayes, 1981). The writer, in turn, develops strategies for handling this "memory overload" condition taking advantage of situations where the creation of one subgoal generates an opportunity for the completion of another (Hayes-Roth & Hayes-Roth, 1979). Thus, the generation of subgoals in the writing process is dynamic rather than a priori (Matsuhashi, 1982). The result is that high-level goals are sometimes replaced by subgoals generated relatively late in the writing process. Thus, the end product of the composing process is often a surprise to the writer (Murray, 1978).

It is the metacognitive ability to monitor this highly complex process of juggling goals and subgoals that separates the writing of skilled versus novice writers and the writing of adults from that of children (Scardamalia, Bereiter & Steinbach, 1984). However, it has been shown that children's metacognitive

control over goals can be improved by giving them verbal prompts about possible next steps in the writing process as they “think aloud” while engaged in the task (Bereiter & Scardamalia, 1982; Scardamalia & Bereiter, 1983, 1985).

The influence of the research and theory on metacognition in the language arts is also evidenced in the literature on reading (Paris, Lipson & Wixson, 1983). Parallels have been drawn between metacognition in reading and metacognitive behavior in other disciplines such as mathematics, memory and problem solving (Brown, 1975; Kail & Hagen, 1982; Resnick & Ford, 1981; Siegler, 1983). The strategic reader, like the strategic mathematician or problem solver, juggles goals and subgoals relative to the purpose of reading, the changing nature of the text, and the extent to which information is new or old (Clark & Haviland, 1977).

Research also seem to suggest the use of componential approaches in teaching thinking (Marzano, 1991). Componential approaches to teaching thinking are those that attempt to develop specific cognitive operations. Although many componential approaches also enhance metacognition, it is not a necessary by-product of such approaches. That is, specific cognitive operations can be enhanced without enhancing a general knowledge and control of self and task. Componential approaches stress learning tactics rather than learning strategies. There are many componential approaches to teaching thinking that can be classified as eclectic - they employ multiple tactics but draw their components from various models of learning and intelligence as opposed to a single model.

A number of componential approaches emphasize a single cognitive operation which is directly or indirectly related to some model of intelligence or learning (Marzano, 1991). Mnemonic devises, for example, are learning tactics that enhance the recall of information (Belleza, 1981). A number of studies have shown rather dramatic effects on recall performance when using such mnemonic devices as the method of loci (Ross & Lawrence, 1968), the peg-word mnemonic (Bugelski, 1968), the link mnemonic (Delin, 1969), and the story mnemonic (Bower, 1972; Bower & Clark, 1969).

Comparing is another tactic which is identifying and articulating the similarities and differences between elements. It is basic to many other cognitive operations and one of the first steps in higher forms of analysis (Feuerstein et al., 1980). Although the difficulty of a comparison task is partially a function of the individual’s knowledge of the content being compared (Mandler, 1983), skill at comparing can be improved. For example, Raphael and Kirschner (1985) found that students’ comprehension, and their production of comparative written summaries, improved when they were taught specific types of comparison structures (e.g., whole/whole, part/part and mixed).

Classifying also is a central component of many theories of cognition and learning. For example, Nickerson et al., (1985) along with others (Mervis, 1980; Smith & Medin, 1981) have asserted that the ability to form conceptual categories is so basic to human cognition that it can be considered a necessary condition of thinking. To classify, individuals must be able to identify the common features or attributes of various entities which form a group or groups. There is evidence that young children can categorize information with which they are very

familiar but have difficulty using categorization as a tool for processing unfamiliar content unless they receive explicit instruction to do so (Moely, 1977). Jones, Amiran and Katims (1985) found that students' ability at categorizing can be improved with explicit instruction, yet extended practice and feedback is needed for transfer to occur.

Closely related to classifying is ordering, which is sequencing or ordering entities on selected characteristics or attributes. Although Piaget concluded that children do not usually master ordering until the concrete operational stage, usually about age 7 or 8 (Piaget & Szeminska, 1941), Feuerstein et al., (1980) found that low-achieving and very young children can develop competence in ordering tasks when specific tactics are reinforced. Similarly, matrix outlining strategies have proven to be effective tools for enhancing the ability to order.

One could also include the summarizing tactic in language teaching to enhance thinking. Brown, Campione and Day (1981) used a rule-based approach to summarizing which includes deleting trivial and redundant material, substituting superordinate terms for lists and selecting or inventing a topic. Their research suggests that younger and low-achieving students have difficulty using these rules especially the last one, which requires them to select or invent a topic. Often, they will select what interests them rather than what is a good organizer for the information that is to be summarized. McNeil and Donant (1982) found that sixth graders could be taught to use summarization rules that significantly affected their comprehension scores.

Note taking is another tactic which could also be used by teachers. DiVesta and Gray (1972) found that note taking provides both encoding and storage functions. It aids the learner in creating a macro-structure for information and provides a form of external storage for later review. In general, results of note taking have shown better recall of information at a time proximal to the presentation of the information, but there have been mixed results at distal points (Peper & Meyer, 1978; Barnett, DiVesta & Rogozinski, 1981). More specifically for language arts, a number of studies have demonstrated its effect on recall for information in notes although instruction in note taking does not insure that students will identify important information on which to take notes (Einstein, Morris & Smith, 1985).

Finding the main idea is another cognitive process that includes the properties of analysis. Although main idea as a construct is not well-defined, Jones, Palincsar, Ogle, & Carr (1987) found that informal oral summarizing can be effectively elicited from students before, during, and after reading text segments via teacher- and student-directed questions that focus attention on the subordinate and superordinate structure of the discourse.

Extending tactics are also considered to be effective in enabling the learner to go beyond what is explicitly stated in textual information (Marzano, 1991). In recent years, a number of types of information-shaping and extending tactics have been identified. Most of them fall within the general rubric of inference. For example, many typologies and thinking skills programs have defined various types of inductive and deductive tactics (Nickerson et al., 1985; Costa, 1985b). Many of these are based on inductive and deductive rules from

syllogistic models. Instructionally, extending is commonly reinforced by presenting students with tactics for creating analogies and metaphors. They have been shown to be powerful cognitive tools in developing ideas in oral discourse, in composing, and in creative thinking (Bransford, Sherwood, Rieser & Vye, 1986; Mayer, 1984, Weinstein & Mayer, 1986).

It is also important to note that a number of approaches to teaching thinking are heuristically based. Heuristics are general rules that, when followed, increase the likelihood of success at a given task. At their core, heuristic approaches provide the learner with actions that, when followed, increase the likelihood of successfully completing specific cognitive operations. Heuristic approaches differ from componential approaches in that they are more "macro" in nature; they deal with more global cognitive operations (Marzano, 1991).

Although heuristics have been developed for a number of cognitive operations (e.g., Beyer, 1988), problem solving and decision making are commonly the focus of heuristically-based approaches. Both problem solving and decision making have been identified as central to cognition of all types (Anderson, 1982, 1983; Rowe, 1985). Studies on expert versus novice approaches to problem solving indicate that experts differ from novice problem solvers in their knowledge and use of general problem-solving heuristics such as devising a plan, representing the problem, carrying out a plan, and checking results (Gick & Holyoak, 1980; Schoenfeld, 1980; Simon, 1980). Schoenfeld (1983a, 1983b) stressed that expert problem solvers are better than novice problem solvers even when dealing with problems outside of their domain of expertise, because they use their general problem-solving heuristics better. Rajendran (1998a) found problem solving strategy to be particularly effective in engaging students in active participation and enhancing their higher-order thinking skills.

Most programs that attempt to foster thinking use a problem-solving orientation (Marzano, 1991). For example, Wales and Stager (1977) have developed a heuristically-based approach to enhancing problem solving and decision making that they refer to as Guided Design. Guided Design has been offered in high schools and colleges as a course to accompany a wide variety of disciplines (e.g., the humanities, the social sciences, the physical sciences and engineering). Using freshmen in engineering at West Virginia University, Wales (1979) found increases in grade point averages after four years even after controlling for grade inflation.

Many of the processes within the CoRT Thinking Program (de Bono, 1976, 1983, 1985) also can be classified as decision-making and problem-solving heuristics. The materials are content free as possible, reflecting de Bono's desire to develop heuristics for "real life" thinking versus artificial, academic situations. Although it is probably the most widely used program for teaching thinking, CoRT has not been extensively evaluated (Resnick, 1987). De Bono (1976), however, reported several experiments involving idea counts contrasting students who had received CoRT instruction with control groups. Results indicated that CoRT instruction leads to the production of more ideas and a more balanced and less egocentric view of problems.

The componential and heuristic approaches discussed so far are rooted in psychology and focus on fairly specific cognitive operations. There is also another important component in the area of teaching thinking, the critical thinking skills. Critical thinking approaches are rooted in philosophy and attempt to enhance use of formal logic and dispositions of thought neither of which are easily reduced to a series of steps. Many nineteenth-century logicians regarded logic as providing the basis of everyday reasoning. That is, they assumed that one is always using logic to make decisions, solve problems, and complete tasks. However, in recent years a number of studies have shown that, in everyday thinking, highly intelligent individuals often fall prey to a variety of errors in logic (Perkins, Allen & Hafner, 1983).

Some critical thinking programs have attempted to develop mental logic through the teaching of syllogistic rules of reasoning. For example, Instrumentation Enrichment (Feuerstein et al., 1980) contains instruments that deal with syllogisms. Similarly, Philosophy for Children (Lipman, Sharp & Oscanyan, 1980) includes exercises in syllogistic reasoning. More commonly, though, critical-thinking programs include practice in recognizing informal fallacies (e.g., the gambler's fallacy, equivocation) that purportedly introduce error into one's normally error-free system of mental logic (Negin, 1987).

The other approach to teaching critical thinking is dispositional in nature. Dispositions are habits of thought, cognitive "mental sets" for specific situations (Resnick, 1987). There have been a number of attempts to identify the dispositions of effective reasoning. For example, building on the work of Dewey (1983), Baron (1985) identified a number of dispositions for "good thinking." These include such mental habits as recognizing a sense of disequilibrium or doubt, identifying goals, searching for evidence, and revising one's plans when appropriate. Similarly, Ennis (1985) identified a set of critical thinking dispositions that include many of Baron's along with seeking precision, looking for alternatives, and seeing other's point of view.

Closely related to critical thinking is creative thinking. Creative thinking is geared more toward the production of information whereas critical thinking is geared more toward the analysis of information. Many approaches to enhancing creativity focus on solving novel and sometimes unstructured problems in new and unusual ways. For example, two international, interscholastic competitions, the Future Problem Solving Program (Crabbe, 1982; Torrance, 1980) and Olympics of the Mind (Gourley, 1981) use a problem-solving format to enhance creative thinking.

In a review of 166 experimental studies of teaching creativity skills at elementary and secondary levels since 1972, Torrance (1986) found that 17 percent used some type of creative problem-solving process similar to those used in Olympics of the Mind and Future Problem Solving. Torrance reported that other approaches included the use of media and reading, the creative arts, training in affective components, tactics to effect altered awareness, and packaged materials. Of these, the creative problem-solving approaches had a 77 percent success rate.

Critical and creative thinking are grounded in the language arts in a variety of ways. Language-arts teachers, for example, have traditionally used oral and written language as tools for enhancing critical and creative thought. Similarly, Socratic questions that induce thoughtful student response, large and small group discussions, in-depth analysis of text, the study of language in relation to nonprint media, propaganda, and persuasion, among others, have been means to this end. Indeed, critical and creative thought are at the very core of literacy (Marzano, 1991).

Defined in the “low” senses, literacy is the ability to read and write in a manner consistent with the adult norms in a society (Resnick, 1987). However, defined in the “high” sense, literacy includes many of the critical and creative-thinking skills and dispositions (Resnick, 1987). The high literacy tradition has emphasized critical and creative thinking under the general rubric of rhetorical invention (Clanchy, 1983; Clifford, 1984). Kinneavy’s (1980) work on the invention process is of particular importance here. Also, included in the high literacy tradition are new theories of the nature and process of reading.

I am of the view that there are various strategies and techniques available to teachers which they could use to enhance their student’s higher-order thinking abilities. Strategies and techniques are important for teachers to create a conducive learning environment for the teaching of thinking (Costa, 1985c; Sternberg and Spear-Swerling, 1996). Only deliberate attempts by teachers to create a classroom discourse where there is increased student autonomy and interaction seem to promote the acquisition of higher-order thinking skills by the students (Barell, 1991; Bereiter and Scardamalia, 1987; and Hillocks, 1986). Discussion is often suggested as a preferred method (Eisner, 1983: Ennis, 1985; Paul, 1985; Perkins, 1987). Dillon (1984) distinguishes between recitation and discussion calling for higher cognitive skills than recitation. He states, however, that there is little empirical research on discussion. Bridges (1979) point out the necessity of dispositions such as openness and respect for others as necessary conditions for a discussion.

In order to stimulate true discussion in the classroom, researchers seem to recommend the following key characteristics be kept in mind when planning the discussion: students should speak half or more of the time of matters higher-cognitive abilities; the predominant exchange pattern should be a mix of questions and statements by a mix of students and teacher; the sequence should be a mix of teacher-student, student-teacher, and student interactions; and the overall pace should be fewer, longer, and slower exchanges than in a recitation (Dillon, 1988). It also seems important that teachers plan to use primarily higher cognitive-level questions as the basis for encouraging student interaction and reflective thought.

One way to engage students in taking more responsibility for thinking is to ask more open questions and to acknowledge student contributions in a neutral rather than evaluative manner (van Zee and Minstrel, 1997). Group work, cooperation, and teacher questioning have all been proposed as important components of teaching thinking skills (Dillon, 1984; George, 1984). Smith (1977) studied college classroom environments and found critical thinking to be related

to peer interaction, teacher support, and teacher questioning. In a review of studies of wait-time (i.e., the time that elapses between the teacher's asking and the student's answering of a question) in elementary, middle, and high school classrooms, Tobin (1987) reports that the teacher's increase in wait-time has been related to higher student achievement scores.

In a meta-analysis of teacher questioning, Redfield and Rousseau (1981) concluded that higher cognitive questioning yields higher student achievement. Questions, both from the teacher and students, encourage active student participation. They define higher cognitive questions as those "requiring that students mentally manipulate bits of information previously learned to create or support an answer with logically reasoned evidence" (1981, p. 237). They looked at experiments of teacher training and the teaching of skills. In both, the positive effect of higher cognitive questioning on student achievement was evident.

Teachers can organize their classrooms in a variety of ways to facilitate students becoming actively - not passively - involved in thinking. This might include teacher led, Socratic-type discussions, individual manipulations, and cooperative small-group or total group investigations. These features of classroom organizations are prime factors in creating the kind of classroom atmosphere for thinking (Swartz and Perkins, 1989).

Of all the various patterns of classroom organization that a teacher might use, some achieve better results than others for certain students, at certain grade levels, and for certain goals of instruction. Group work, for example, is characterized by subdivision of the class into work groups or committees. Objectives for the group may be assigned, roles in the group (such as chairperson, recorder, process observer, etc.) may be clarified, and standards for harmonious group work may be set. While the groups are working, the teacher monitors their progress. This organizational pattern has great advantages for developing thinking skills. The Johnsons found that when students work cooperatively in groups, increased reasoning strategies and greater critical thinking competencies result than in competitive or individualistic settings (Johnson, Johnson and Holubec, 1990).

What seems important is that teachers need to exploit the potential of these strategies and techniques to cater for student thinking. What this entails is that teachers are aware of the potential of the strategies and actually use them in their own classrooms. If teachers consciously make attempts even the simplest type of a strategy could be used for the promotion of higher-order thinking skills. Perkins (1992), for example, suggests that if teachers use the constructivist approach, even when the task is sheer memorization, the learner plays a very active role, struggling to understand, formulating tentative conceptions, testing those conceptions out on further instances.

Other Factors Which Need to be Addressed

It could be seen from the discussion above that the teaching of four language components is indeed closely related to the teaching of higher-order

thinking skills. There are also many strategies and techniques available to language teachers which they could use, based on the background of their own students and classrooms, to enhance the higher-order thinking abilities of their students. However, what seems important is that teachers need to make deliberate attempts to create the conducive learning environment in their classrooms for the acquisition of higher-order thinking skills by their students.

In relation to this, there are number of factors which need to be addressed. In my opinion, these factors to a large extent determine the type of teaching and learning that goes on in classrooms. In other words, for the enhancement of higher-order thinking skills to be effective in language teaching, the following factors have to be dealt with.

Teachers' Knowledge, Skills and Attitude for Teaching Higher-Order Thinking Skills

There is a general agreement in the literature that teachers need to be trained in critical thinking dispositions and skills in order to be able to teach thinking effectively (Idol, L. & Jones, B. F. 1990; Lipman, 1985; Nickerson, 1987; Swartz, 1987; Winocur, 1985). There is some anecdotal evidence to support this view. Ulmer (1939), in a study of teaching high school geometry to enhance reflective thinking, noted that the two teachers in the experimental condition whose classes had the highest scores, had themselves participated in a course on teaching logic in geometry just prior to the study. In addition, the teacher in the experimental condition whose class scored lowest, had joined the study late and had not had the full training.

George (1967), in a study of student teachers, compared the critical thinking abilities of science education majors with non-science education majors. He found that the science education majors scored significantly higher on the Watson-Glaser Critical Thinking Test than did all the other education students with the exception of the mathematics education students. It was concluded that the disciplines of science and mathematics foster the development of critical thinking more than other subject areas. An alternative interpretation, however, is that better critical thinkers tend to go into mathematics and science teaching. Whether the critical thinking scores of the science and mathematics teachers will carry over into the classroom and improve their teaching was not investigated.

In a study involving teachers, department chairs, and principals Onosko and Newmann (1994) attempted to find out, among other things, their conceptions of and commitment to higher-order thinking as an educational goal, and the factors they perceived as necessary to accomplish it. They reported that academic departments committed to higher-order thinking as a fundamental instructional goal had teachers whose classrooms showed more thoughtfulness than departments not committed to this goal. Based on classroom observations, open-ended interviews with students, and survey questionnaire items, they reported that students were more likely to try, to concentrate, and to be interested in academic study when they are challenged to think.

Onosko and Newmann also identified the barriers or obstacles to the promotion of higher-order thinking skills in classrooms. One of the barriers, they suggest is that teachers perceive teaching as knowledge transmission. As a result, Rajendran (1998a), in his work, found teachers dominating the discourse in language classrooms. Cuban (1984), in the same respect, after researching the pedagogical practices in American classrooms for a period of 90 years concluded that, the dominant forms of classroom "discourse" past and present are teacher lecture and teacher-led recitations. The overriding agenda is to transmit to students' information and ideas, and then request that students reproduce them either orally or in writing.

Another barrier to the promotion of higher-order thinking in classrooms is the low expectations of students from teachers (Onosko and Newmann, 1994). They reported that, some teachers in their study assumed that students lacked the inherent mental capacity, the raw "brain power," to engage in higher-order thinking, especially those students labeled low achievers or low ability. When students are perceived to lack thinking skills, many teachers are less likely to craft lessons that require higher-order challenges.

Teachers need subject matter knowledge, the necessary pedagogical skills, and the attitude to teach. Recent research has documented some of the important ways that teachers' knowledge of the subjects they teach shapes their instructional practice. A number of studies have suggested that teachers with richer understanding of subject matter tend to emphasize conceptual, problem-solving, and inquiry aspects of their subjects, whereas less knowledgeable teachers tend to emphasize facts and procedures (Ball, 1988; Wilson, 1988; Ball and McDiarmid, 1990).

Cohen, et al. (1991) investigated a California classroom where there were ambitious efforts to revise mathematics and learning were taking place. He found that the teacher used a new mathematics curriculum, but used it in a way that conveyed a sense of mathematics as a fixed body of right answers, rather than as a field of inquiry in which people figure out quantitative relations. He also found that a didactic form of lesson in the classroom inhibited explanation or exploration of students' ideas. Cohen suggests that the teacher did not have a firm grip on the estimation aspect of mathematics she was teaching. As a result, he suggests, "She taught as though she lacked the mathematical and pedagogical infrastructure - the knowledge of mathematics, and of teaching and learning mathematics - that would have helped her to set the problem up so that the crucial mathematical data were available to students" (p.335).

In the teaching of language arts, Grossman (1990) conducted case studies of six teachers to explore the complex interrelationship among beliefs about teaching, subject matter knowledge, and teaching context in the development of conceptions about teaching English. The teachers' own experiences as students in English Language classes provided implicit models for the teaching of literature and writing. Grossman found that while subject matter knowledge and apprenticeships of observation were available to them as sources of knowledge, the teachers drew much more from their subject-specific teacher education coursework, like the methods courses contextualized in

specific school subjects, intended to provide strong subject-specific preparation in English, in constructing their conceptions of the purposes and appropriate practices for teaching English.

There are various ways researchers have defined the necessary components for teaching a school subject. In that respect, the four categories suggested by Grossman (1990) needed to construct the pedagogical content knowledge seem to be very useful for identifying what teachers need to teach a school subject. Four categories also seem to fit the requirement for the teaching of higher-order thinking skills in English Language classrooms.

First, the teachers' overarching conception of teaching a subject in his or her knowledge and beliefs about the nature of the subject and what is important for students to learn. The second component of the pedagogical content knowledge is knowledge of instructional strategies and representations for teaching particular topics, including the models, examples, metaphors, and so forth the teacher uses to foster students' understanding. The third component of pedagogical content knowledge is knowledge of students' understandings and potential misunderstandings in the subject area. The fourth component is the knowledge of curriculum and curriculum materials, which includes familiarity with the range of textbooks and other instructional materials available for teaching various topics.

In an investigation on the teaching of higher-order thinking skills in language classrooms, Rajendran (1998a) found that teachers lacked in at least two categories, i.e, the overarching conception of teaching a subject, and in the knowledge of instructional strategies and representations for teaching particular topics. This was more evident for higher-order thinking skills than for English Language. There was a significant difference between teachers' perceptions of their knowledge and pedagogical skills for teaching English Language as compared to teaching higher-order thinking skills. Given this situation, teachers, obviously, found it difficult to construct the pedagogical content knowledge to infuse higher-order thinking skills in the teaching of English Language.

Teachers' Beliefs About Teaching, Learning, and Students

Teachers' views of teaching and learning influence their classroom practice (Prawat, 1992). Prawat also suggests that currently, these beliefs support traditional practice, best characterized as a "transmission" approach to teaching and an "absorptionist" approach to learning. As a result, the dominant forms of classroom "discourse" past and present are teacher lecture and teacher-led recitations (Cuban, 1984; Sternberg and Martin, 1988). The overriding agenda is to transmit to students information and ideas, and then request that students reproduce them either orally or in writing.

Teachers' views of teaching and learning constitute an important obstacle in attempts to change normal patterns of classroom interaction (Cohen, et al. 1990; Putnam and Borko, In press). It is also true, for example, in the case of constructivist approach to teaching. While there are several interpretations of

what this theory means, most agree that it involves a dramatic change in the 'focus' of teaching, putting the students' own efforts to understand at the center of the educational enterprise (Prawat, 1992). The adoption of such an approach to teaching and learning would result in major changes in the teacher's role. Thus, in all constructivist teaching-learning scenarios, the traditional telling-listening relationship between teacher and student is replaced by one that is more complex and interactive. It is not surprising that constructivist teaching places greater demands on teachers and students. As Cohen (1988a) points out, "Teachers who take this path must work harder, concentrate more, and embrace larger pedagogical responsibilities than if they only assigned text chapters and seatwork" (p.255).

For thinking to take place in classrooms, it may be important for teachers to convey to students that the goal of instruction is thinking, that the responsibility for thinking is theirs, that is desirable to have more than one solution, that it is commendable when they take time to plan, that an answer can be changed with additional information. Much research has also shown that active learning has a positive effect on students' development of decision-making and problem solving skills (Thomas, 1980, cited in Costa, 1985a). When higher-level thinking, creativity, and problem solving are the objectives, students need to be in a classroom climate where they are in the decision making role (Costa, 1985b).

In order to achieve those goals, Bereiter and Scardamalia(1987) suggest that students be prepared to gradually take over all the goal-setting, context-creating, motivational, analytical, and inferential actions that in other models belong to the teacher. They call this 'high literacy.' Teaching strategies that begin with teacher modeling and that gradually turn more of the executive control over to children have been shown to be effective in both comprehension (Palincsar and Brown, 1984, cited in Bereiter and Scardamalia, 1987) and in composition planning (Scardamalia et al., 1984, cited in Bereiter and Scardamalia, 1987).

They also suggest that,

> A more accurate characterization of the high literacy tradition would be that it presupposes high-order cognitive skills. Students have been expected to read the works of the greatest writers and thinkers, and their own writing has been expected to reflect in some measure the qualities found in those works. But the cognitive resources necessary for doing this have not been identified; much less have means been sought for developing them in students who did not already have them. (Bereiter and Scardamalia, 1987, p.16)

It also seems important that teachers give importance to students' ability to contribute to the teaching and learning processes. Students' individual knowledge construction processes too may have to be taken into consideration in the teaching of thinking skills.

> If learners are to come to know what their teachers know, therefore, more is required than the presentation of propositional knowledge through talk or text. …there needs to be extended opportunity for

> discussion and problem-solving in the context of shared activities, in which meaning and action are collaboratively constructed and negotiated. In other words, education must be thought of in terms not of the transmission of knowledge but of transaction and transformation.
>
> (Chang-Wells and Wells, 1993, p.59)

Because knowledge has to be individually constructed, it cannot be transmitted from one individual to another simply by uttering the appropriate propositions, despite what many educational theorists seem to believe (Heap, 1985, cited in Chang-Wells and Wells, 1993, p. 59).

Continuos Professional Development of Teachers

What seems important is the need for comprehensive programs to provide on-going on-site professional development for teachers. On-going professional development efforts may provide teachers the opportunity to be members of a professional community which may allow them to move away from the notion that teaching is an individualistic and idiosyncratic practice (Buchmann, 1993). Teachers need to be encouraged to contextualize their discussions on teaching higher-order thinking skills.(pp.305) (Rajendran, 1998a).

In a study on the teaching of higher-order thinking skills in language classrooms, Rajendran (1998a) found that although 59 percent of the teachers have received some form of training to teach higher-order thinking skills, and the rest of 41 percent of the teachers did not receive any training to teach higher-order thinking skills, this did not seem to have significantly influenced their perceptions of their knowledge, pedagogical skills, and attitude.

While one can speculate on the effectiveness of the training provided and the sustainability of these new changes amongst teachers, it seems pertinent that there needs to be serious efforts to make professional development an ongoing part of teachers' daily work through joint planning, study groups, peer coaching, and research. Rather than relying too much on the 'sit and get' type of in-house training workshops, ongoing professional development efforts need to provide opportunities for teachers to reflect on their practice, and discuss the issues among themselves and benefit from each other. Teachers need to learn to communicate openly and honestly, to confront differences and resolve conflicts, and to sublimate personal goals for the good of the team (Reimers & McGinn, 1997).

In specific contexts, there has to be process facilitators such the school principals who have to determine the best ways to help groups reach decisions and function effectively. Most groups use face-to-face interaction, the most common and easiest way of group interaction. Other alternatives include: brainstorming, the nominal group technique - group participants are asked to produce solutions individually after group exchange and prior to further exchange; Delphi exercises, to obtain consensus among group members;

ideawriting, a method for developing ideas and exploring their meaning; and interpretive structural modeling, a method to identify relationships among the key aspects which define an issue or problem (Moore, 1994).

Teachers need to be encouraged to contextualize their discussions on teaching higher-order thinking skills in the teaching of English Language or any other school subject. For this to happen there has to be support from the school administration, especially in providing the resources for teachers to organize such study groups. There also need to be incentives for teachers who volunteer to participate in such initiatives. As discussed earlier, teachers need to focus on acquiring subject-specific pedagogical skills to integrate thinking skills in their content instruction. This is different from how it is generally being done now where teachers are given the generic thinking skills and they are expected to figure out on their own how to integrate those skills in their content instruction.

These ongoing professional development efforts may provide teachers the opportunity to be members of a professional community which may allow them to move away from the notion that teaching is an individualistic and idiosyncratic practice (Buchmann, 1993). These professional communities could help teachers improve their practice. In the case of an autobiography book club, for example, Florio-Ruane et al., (1995) reported that changes in teachers' beliefs occurred after teachers participated in these clubs. The experience consisted in helping teachers feel comfortable with the members of the group. Once this occurred, teachers were willing to place their own experience and beliefs on the table to be evaluated by their colleagues. Besides this school-based ongoing professional development initiatives, there also need to be efforts to organize new sources of professional development such as learning networks and school-university or teacher college partnerships that transcend school boundaries. Teachers may be able to keep up with latest directions in research from such involvement, and learn from them as well.

Framework for Teaching Thinking

There are various programs now available now for teaching thinking. Although these resources are useful and show great progress in our awareness of the need to foster thinking, the different definitions of thinking and the number of available options can be confusing (Marzano, et al., 1988). In fact, it would be a mistake to assume that thinking instruction is somehow contained in this abundance of programs and that offering one or more them is sufficient. Such an assumption is dangerous because it ignores the need to conceptualize basic skills such as reading and writing as thinking and because it ignores the need to infuse teaching thinking in all curriculum areas.

Marzano et al., (1988) suggests that what has been missing in current theory and practice is an organizing framework for teaching thinking - a latticework to systematically examine themes common to the different approaches and relationships among them. An appropriate framework may also

allow practitioners in different subject areas and grade levels to develop a common knowledge base and a common language for teaching thinking.

Teachers very often rely on different taxonomies which are available. By far the most popular taxonomy is Bloom's taxonomy (1956) with six cognitive levels. While having various levels in the taxonomies have proved to be confusing for teachers, there have been recent attempts to provide taxonomies which have fewer categories. One such attempt was undertaken by Onosko and Newmann (1994). They suggest that different conceptions can all be subsumed under the larger construct of higher-order thinking and made distinct from lower-order thinking (Ononsko and Newmann, 1994, p.28). Resnick's (1987) discussion, for example, characterized higher-order thinking as nonalgorithmic, complex, self-regulative, meaningful, effortful, and providing multiple solutions, nuanced judgments, multiple criteria, and uncertainty all defined in terms of cognitive traits and processes of individuals. There is certainly a need to have concerted efforts to offer simpler and practical taxonomies to teachers, and more specifically to language teachers.

Terminology for Teaching Thinking

A closely related topic is the terminology for teaching thinking. To researchers and educators alike, *thinking* has a variety of connotations. Critical thinking, creative thinking, reasoning, problem solving, and decision making are among the topics around which substantial research literatures have developed (Nickerson, 1988). These literatures, while interrelated, are remarkably distinct and self-contained. Even within the articles and books that are focused on the teaching of thinking, one can find numerous definitions and characterizations of thinking, or, more commonly, of specific types of thinking.

Programs and approaches that have been developed to teach thinking in the classroom reflect the many-faceted nature of thinking, and differ not only in methodology but in goals. Some focus on the development of basic cognitive processes that are assumed to be essential to cognitive competence in a general sense; some on the learning of specific procedures, strategies, or heuristic methods for problem solving or decision making that are believed to be applicable in a wide variety of domains; some on the cultivation of reflectively critical attitudes, dispositions, or cognitive styles that attach high value to rationality and the unbiased use of evidence in the formation and revision of beliefs; some on the development of a more explicit awareness of one's own thought processes and a better understanding of how to monitor and manage them; and so on.

Because of the varied nature of programs being implemented, there is a considerable amount of confusion amongst teachers about the definition of thinking and the terminology used to refer to the definition. As suggested by Nickerson (1988), "If there is one point on which most investigators agree, it is that thinking is complex and many faceted and, in spite of considerable productive research, not yet well understood" (pp.9). In relation to this, Rajendran

(1998a) found that both teachers and students in the English Language classrooms investigated generally had naïve assumptions of higher-order thinking skills. Rajendran also found that,

> Teachers and students' perceptions of higher-order thinking skills which seem to be inconsistent with general definitions of those skills certainly seem to be influencing the teaching and learning of those skills in classrooms. The implication of such perceptions to instruction seems to be that they work against achieving the objective of infusing higher-order thinking skills in content instruction. Since both the teachers and students do not have clear understanding of higher-order thinking skills, they seem to have a limited notion of higher-order thinking skills, and as a result seem to be content with routine practices in the classrooms. (Rajendran, 1998a, pp.158)

What this calls for is the better understanding of the domain of thinking and the terminology to define such an understanding both by researchers and teachers. It needs to be broadly enough conceived to include proving a geometry theorem, evaluating an argument in a newspaper article, organizing one's ideas for a composition, and debugging a computer program. At the same time, it also needs to cater for acquisition of domain-specific knowledge to thinking, that is to organize their knowledge on the basis of concepts, principles, and abstractions that reflect deep understanding of the domain (Nickerson, 1988).

Conclusion

Available evidence seem to support the argument that teachers need a deep understanding of the subject matter, i.e., English Language, to be able to teach. There is also evidence to support the argument that teachers' own subject matter knowledge influences their efforts to help students learn the subject matter. Besides the subject matter knowledge, teachers also need pedagogical skills to teach the subject matter to the students. Teachers need to be able to construct the pedagogical content knowledge to teach the subject matter to the students.

When it comes to the teaching of higher-order thinking skills in language classrooms, teachers need a deep understanding of the English Language and higher-order thinking skills to be able to teach both of them in their classrooms. They also need to be able to construct the pedagogical content knowledge, not only for the teaching of English Language, but also for teaching higher-order thinking skills. Since higher-order thinking skills and English Language are both taught together (i.e., using the infusion approach) teachers need to be able to construct the specific pedagogical content knowledge necessary to teach higher-order thinking skills in their English Language classrooms. Although there is

literature available on how teachers construct the pedagogical content knowledge to teach language arts, there seems to be no studies which have attempted to investigate how teachers construct pedagogical content knowledge to teach higher-order thinking skills. For that matter, no studies have so far seem to have attempted to investigate how teachers jointly construct pedagogical content knowledge for teaching language arts and higher-order thinking skills in their classrooms.

Available evidence also suggests that teachers need to possess the right attitude and beliefs necessary to teach higher-order thinking skills and English Language. This is because teachers' views of teaching and learning influence their classroom practice. It has been shown that what teachers think of their students also influences their teaching, and in this case the teaching of higher-order thinking skills in language classrooms. There also seems to be a serious need for teachers to change their beliefs so that students could be prepared to gradually take over all the goal-setting, context-creating, motivational, analytical, and inferential actions which are usually done by the teachers.

The teaching of higher-order thinking skills and the teaching of language arts are very closely related. Some even argue that the proper teaching of English Language is equivalent to, or sufficient for, promoting higher-order thinking. There is also evidence to suggest that language abilities and thinking competencies shape each other. In relation to this, there seems to be a need for teachers to exploit the four language components, i.e., listening, speaking, reading, and writing, to promote thinking skills among students. Thinking seems to be inherent in almost all activities encompassing the four language components.

The is also evidence to suggest that there are various approaches, strategies and techniques which could be used by teachers through the four language components to promote higher-order thinking skills among students. It seems obvious that conscious efforts on the part of teachers to use various strategies and techniques to promote higher-order thinking skills among students have shown positive results. Conscious efforts by teachers, especially by using some specific strategies and techniques, also seem to be one of the prerequisites to creating a conducive learning environment for the teaching and learning of higher-order thinking skills in English Language classrooms.

Besides this, there is a serious need to have continuous professional development for teachers. These programs need to be on-going and on-site and should encourage teachers as professionals to find solutions to their problems, and in this case for the teaching of higher-order thinking skills in language classrooms. There is obviously a need for framework and terminology for teaching of higher-order thinking skills in language classrooms to be effective.

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