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Metacognitive Knowledge and Language Learning[1]

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Dating back to the early 80s, the FL/SL literature on learner strategies and on self-directed language learning documents an ongoing recognition of the need to help language learners reflect upon and refine their beliefs and knowledge about learning, i e their metacognitive knowledge To date, however, this literature has not been explicit about the function of this knowledge in language learning This article reviews selected theoretical and research literature on metacognition to address this lack It argues that insights provided by the review can enhance our understanding of those approaches to second language acquisition which assign an active role to the learner, and concludes with a consideration of practical implications for foreign and second language instruction

INTRODUCTION

> 'Is this a memory thing? (referring to a laboratory task) didn't they tell you I can't do this stuff ? didn't they tell you I don't have a memory ?' (a learning disabled 11-year old)

> 'I think the improvement of language is due to some ability personal ability In my case, I have no personal ability So I think it will take a long time there is no good way to speed up my learning (a Japanese business man)

> 'I'm watching my English by learning more vocabulary because without words—English consists of words and I think I should learn more In level 9, I was really studying English I felt relaxed I was doing something I was learning words ' (a Yugoslavian undergraduate)

These statements, excerpted from learner accounts,[2] suggest that learners of different ages and varying in learning proficiency will have acquired some knowledge about learning, which influences their approach to learning and the expectations they hold about the outcome of their efforts It is this knowledge about learning, referred to as metacognitive knowledge, that is the focus of this article

Foreign and second language educators involved in learner training, i e providing instruction in the use of cognitive strategies or the skills for self-directed language learning, agree that metacognitive knowledge should also be a component of these programs (e g Holec 1981, 1990, 1994, Wenden 1986, 1987a, 1991, 1995, Dickinson 1987, Horwitz 1987, 1988, Casanave 1988, Carrell 1989, Eriksson 1993, Cotterall 1993, 1995 , Little 1994, Chamot

and O'Malley 1994, Chamot 1995, Rubin 1995, Gremmo and Riley 1995, Victori and Lockart 1995, Benson 1996, Riley 1996, Sinclair 1996) However, until now there has been no explicit, theoretically-based discussion of the function of metacognitive knowledge in language learning This article intends to address this lack First, it briefly clarifies what is intended by the term metacognitive knowledge Next, it reviews selected theoretical and research literature on metacognition to determine how this knowledge comes into play in the self-direction of learning, namely planning and evaluating, task analysis (a component of planning), monitoring, and the transfer of learning (a component of both planning and monitoring) This is followed by a discussion of how insights from the review can enhance our understanding of those approaches to second language acquisition which assign an active role to the learner The conclusion considers the practical implications of the review for foreign and second language instruction

NATURE OF METACOGNITIVE KNOWLEDGE

Very simply, metacognitive knowledge refers to knowledge about learning A more specific understanding of the nature of this knowledge, however, requires a consideration of the following its defining characteristics, the categories which distinguish one kind of metacognitive knowledge from another, and the distinction between metacognitive knowledge and metacognitive strategies

Defining characteristics of metacognitive knowledge

Metacognitive knowledge is the relatively stable information human thinkers have about their own cognitive processes and those of others (Flavell and Wellman 1977), it is a specialized portion of their knowledge base (Flavell 1979) acquired formally or informally, deliberately or incidentally This knowledge is statable—learners can become conscious of and articulate what they know Brown *et al* (1983) distinguish between stable knowledge already stored in long term memory and transient knowledge, i e insights that emerge during the learning process While Flavell and Wellman (1977) characterize it as late developing, in fact, the cognitive literature has documented knowledge and beliefs held by learners of all ages from preschoolers (e g Kreutzer, Leonard, Flavell, as cited in Brown *et al* 1983) to elementary and secondary school children (e g Paris and Byrnes 1989, Chinn and Brewer 1993) and college and university students (e g Schommer 1990)

In the FL/SL literature, metacognitive knowledge is also referred to as learner beliefs (Horwitz 1987), learners' naive psychology of learning (Wenden 1987), learner representations (Holec 1987, Gremmo and Riley 1995), each of these terms pointing to other defining characteristics of this knowledge

Learner beliefs

There is no clear consensus on the distinctions between knowledge and beliefs, although the choice of one term instead of the other is a tacit recognition that there is a difference [3] Generally, knowledge is viewed as factual, objective information, acquired through formal learning (Alexander and Dochy 1995), and, probably, representative of the body of knowledge that constitutes a particular discipline of study On the other hand, beliefs are viewed as individual subjective understandings, idiosyncratic truths, which are often value related and characterized by a commitment not present in knowledge (Alexander and Dochy 1995) [4] Flavell (1987) suggests that beliefs about learning are a component of metacognitive knowledge, a view shared by Alexander and Dochy (1994)

Learner representations

The term learner representations comes from constructivist psychology, and points to the fact that metacognitive knowledge is not an exact replica of experience but encoded in long-term memory in the manner in which it is perceived by a learner It varies depending on the type and extent of the analysis that was performed (Craik as cited in Cavanaugh and Perlmutter 1982) and on whether it is generalized or specific (Paris and Byrnes 1989, Bialystok 1994)

Naive psychology of learning

A learner's naive psychology of learning is linked to another constructivist notion, i e of the child as theorist (Paris and Byrnes 1989, Karmiloff, Smith, and Inhelder 1974/75, Brown *et al* 1983) It acknowledges that learners generate their own hypotheses about factors that contribute to learning and that these notions are not arbitrary Learners make some attempt to validate them and the resulting insights are linked to one another in a logical fashion Together these terms point to the following characteristics of metacognitive knowledge and beliefs

(1) a part of a learner's store of acquired knowledge
(2) relatively stable and statable
(3) early developing
(4) a system of related ideas
(5) an abstract representation of a learner's experience

A final characteristic distinguishes beliefs from metacognitive knowledge, i e their value-relatedness and idiosyncratic nature, suggesting that beliefs would be held more tenaciously than knowledge [5]

Categories for classifying metacognitive knowledge

Metacognitive knowledge has been classified according to whether it focuses on the learner, the learning task or the process of learning Flavell (1979, 1981, 1981a) refers to these three categories as person, task and strategic knowledge, and though these distinctions are not strictly adhered to by all, the variety of knowledge types referred to in the cognitive and FL/SL literature can usually be categorized as one or the other

Person knowledge is general knowledge learners have acquired about human factors that facilitate or inhibit learning The cognitive and affective variables hypothesized as influencing language acquisition in SLA research are examples of such factors, e g age, language aptitude, motivation (see Ellis 1986 and Brown 1987 for a review of this research, and Horwitz 1987, 1988 and Victori 1995 for research which documents FL/SL learners' beliefs about several of these factors) In addition, person knowledge includes specific knowledge learners have acquired about how the above factors apply in their experience The Japanese business man, referred to earlier, believed he did not have the personal ability necessary for language learning, the learning disabled child believed that he did not have a memory Learners may also have acquired (person) knowledge about their proficiency in a given area, based on assessments they have made or received about their skills Language learners, for example, will have some notion of how well they read, write, how much grammar they know Further, person knowledge includes what learners believe about their effectiveness as learners in general, i e self-efficacy beliefs about their ability to mobilize and manage the resources necessary to learn and to sustain the effort (see Cotterall 1995, Lloyd, Mikulecky and Huang 1997 for research on self-efficacy beliefs of language learners) Finally, person knowledge refers to beliefs about their ability to achieve specific learning goals, such as the knowledge and/or skills they need to write in a second language, i e achievement beliefs

Task knowledge has three facets It refers to what learners know about the purpose of a task and how it will serve their language learning needs, e g to improve their writing skills, expand their vocabulary , develop fluency in oral communication It also includes knowledge that is the outcome of a classification process that determines the nature of a particular task This may mean understanding that learning to read is different from learning to write or being able to distinguish a creative thinking task from a problem solving task Finally, task knowledge includes information about a task's demands, i e how to learn in general, how to go about doing a particular task, and the knowledge and skills needed to do so (See Wenden 1986, Horwitz 1987, 1988, Holec 1987, Benson 1990, Victori 1995, Cotterall 1995, Mori 1997 for research on the task knowledge of FL/SL learners)

Task knowledge should be distinguished from domain knowledge, which is utilized to determine the (task) knowledge that will guide the completion of a particular task Domain knowledge refers to what the learner knows about the

subject matter of the learning, i e conceptual and factual knowledge It also includes knowledge about the manner in which this information is communicated, i e the structure of the discourse used to organize it For example, to do a legal analysis, learners must utilize knowledge of the law and of text type, i e of different kinds of cases (Lundeberg 1987) In the case of mathematics, knowledge of measurement, number concepts, and arithmetic problem solving schemata are examples of domain specific knowledge (Glaser 1984) Knowledge of vocabulary and world/content background knowledge are examples of domain knowledge FL/SL learners need for fluent reading (Grabe 1991)

Strategic knowledge refers to general knowledge about what strategies are, why they are useful, and specific knowledge about when and how to use them In fact, it may be logically viewed as a subset of task knowledge However, following Flavell (1979, 1981, 1981a), we include it as a separate classification because of the unique role it plays in the processing (rather than the planning) of learning There is now a respectable body of research which has documented the learning strategies of foreign and second language learners, i e what they do to help themselves learn (e g Rubin 1975, Naiman, Frohlich, Stern and Todesco 1978, Cohen 1990, Hosenfeld 1984, Politzer and McGroarty 1985, Abraham and Vann 1987, Chamot 1987, O'Malley and Chamot 1990, Oxford 1996) However, in some cases, i e the research that utilizes data collecting techniques, such as interviews and questionnaires, which lead learners to retrospect upon their learning, is, in fact, requiring them to draw upon their *stored* metacognitive *knowledge* about learning strategies Thus, the resulting accounts–of strategies learners may actually use or think they use or should use– can also be viewed as evidence of their strategic knowledge

Metacognitive knowledge and metacognitive strategies

As noted in Brown *et al* (1983), metacognitive knowledge and metacognitive strategies are two separate and distinct components of the broader notion of metacognition Therefore they should not be considered interchangeable or similar Metacognitive knowledge refers to information learners acquire about their learning, while metacognitive strategies are general skills through which learners manage, direct, regulate, guide their learning, i e planning, monitoring and evaluating [6] The deployment of these three strategies in learning is referred to as self-regulation in cognitive psychology and as self-direction in adult education and in the literature on learner autonomy in FL/SL learning Because the literature that forms the basis for the analysis that follows is drawn from cognitive psychology, the term self-regulation will be used in this next section of the article [7]

METACOGNITIVE KNOWLEDGE AND LEARNING

According to Flavell (1979), metacognitive knowledge plays an important role in many cognitive activities related to language use, e g oral communication of information, oral persuasion, oral comprehension, reading comprehension, and writing, to language acquisition, and to various types of self-instruction It is activated deliberately when the nature of the learning task requires conscious thinking and accuracy, when the task is new, or when learning has not been correct or complete However, it may appear automatically, evoked by retrieval cues in the task situation, and finally, 'it may and probably does influence the course of the cognitive enterprise without itself entering into consciousness' (Flavell 1979 907–8)

The literature reviewed notes that metacognitive knowledge characterizes the approach of expert learners to learning (Baker and Brown 1984, Nickerson *et al* 1985, Wong 1986, Garner 1987), it enhances learning outcomes (Dickinson 1995, Zimmerman 1989, Zimmerman and Bandura 1994), facilitating recall (Flavell as cited in Nickerson *et al* 1985), the comprehension of written texts (Brown *et al* 1986, Schommer 1990, Schommer *et al* 1992), the completion of new types of learning tasks (Vann and Abraham 1990), it improves the rate of progress in learning (Victori and Lockart 1995), and the quality and speed of learners' cognitive engagement (Pintrich *et al* 1993)

Of special relevance, however, is the influence of metacognitive knowledge in the self-regulation of learning, i e in planning, monitoring and evaluating According to the literature, it is a prerequisite to self-regulation (e g Butler and Winne 1995, Baker and Brown 1984), helping learners to become 'active participants in their own performance rather than passive recipients of instruction ' (Paris and Winograd 1990 18) and providing the knowledge base for effective planning, monitoring and evaluating (Perkins and Salomon 1989) More specifically, the review has shown how metacognitive knowledge influences planning, evaluating and monitoring in the self-regulation of learning In addition, it has brought to light the role of this knowledge in task analysis and learning transfer, two processes implicit in the planning and monitoring of learning that have, heretofore, been ignored

Planning and evaluating

The metacognitive knowledge learners have acquired about themselves as learners (i e their person knowledge) has been shown to influence their choice of learning objectives and the criteria they use for evaluating learning outcomes In their research, Zimmerman and Bandura (1994) have considered the influence of beliefs learners hold about their ability to mobilize and direct resources for learning and to sustain this effort (i e self-efficacy beliefs) and to master a particular academic subject, e g history, or to acquire particular skills, e g computer programming or writing (i e achievement

beliefs) They hypothesize that the stronger the learners' self-efficacy beliefs, the more challenging their learning goals will be and the more intensely they will seek to overcome obstacles faced in the course of learning Their causal model of self-regulation in writing (Figure 1) explains how this hypothesis is reflected in the manner in which learners regulate their attempts to master academic writing, i e select learning goals and evaluation criteria

As illustrated in Figure 1, learners who believe they can regulate their writing and maintain their efforts to do so (self-regulatory efficacy for writing, i e self-efficacy beliefs) will be inclined to believe they can learn to write (self-efficacy for academic achievement, i e achievement beliefs) and set stringent evaluative criteria for themselves (self-evaluative standards) This, in turn, leads them to aim for high grades (grade goals) Learning outcomes (their final grades), according to the model, are directly related to these last three factors, i e their achievement beliefs, evaluation criteria, learning goals, and indirectly related to their beliefs about self-efficacy (see Groteluschen *et al* 1990 for similar views, and Zimmerman and Bandura 1994 for the results of a study which supports the assumptions made by the model)

While Zimmerman and Bandura (1994) focused on the level of achievement reflected in the learning goals of undergraduate students, Boekaerts (1992) makes explicit the manner in which metacognitive knowledge is brought to bear upon the kind of goals younger students set in response to a task

According to her model of the affective learning process, when a classroom teacher assigns a task, the learners' perception of the task's demands triggers

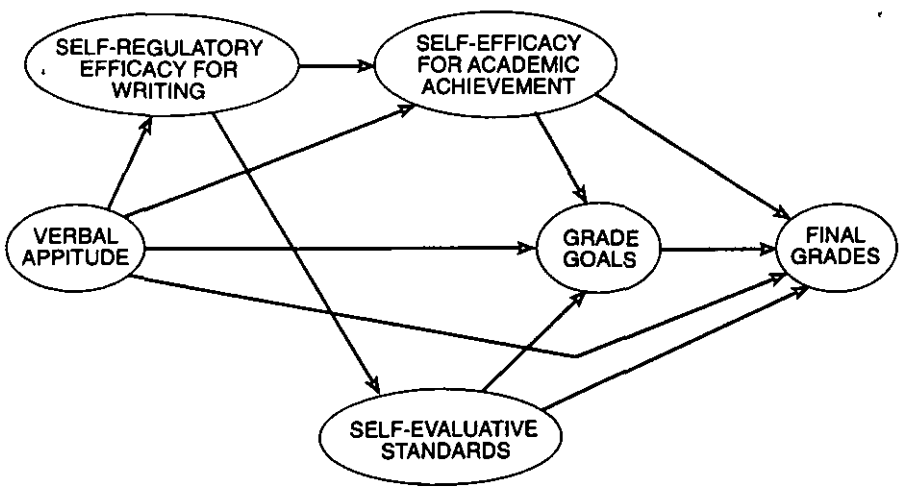

Figure 1 A causal model of student self-regulation of writing achievement (Zimmerman and Bandura, 1994) Copyright (1994) by the American Educational Research Association

an appraisal process that is based on two categories of metacognitive knowledge

(1) what they know about themselves as learners (person knowledge)—whether they possess the knowledge and skills necessary to do the task, whether they are competent as learners
(2) their perception of the task's purpose (task knowledge)—whether it is compatible with their goals

If learners determine that they have the skills and the competence to do the task and if they consider that the task's purpose will serve their learning goals, they will choose learning oriented goals, i e goals that will enable them to expand their knowledge or gain new skills On the other hand, if the appraisal is negative, learners may choose coping oriented goals, i e they try to minimize the discomfort resulting from their lack of skill, or choose to avoid the task completely For example, assuming a teacher has asked learners to complete and hand in a set of questions based, on a chapter in their science text, learners whose task appraisal has been positive may choose to outline the reading upon which the questions are based, seeking not just to get the questions answered but to understand the material In contrast, learners who believe they have difficulty with science or who consider themselves poor readers may decide to ask their friends for the answers

The criteria by which learning outcomes are evaluated, Boekaerts (1992) notes, are influenced by a learner's goals Learning-oriented goals are evaluated according to learning outcomes Learners who decided to outline the reading will determine they have been successful if they understand the questions and can answer them However, the others, who approached the task differently, may be pleased because they receive a good grade or, simply, the teacher's approval for handing in the questions, in this case, the criteria for determining success being external (See Volet 1991 for similar findings based on her research on college students)

The L2 learner strategy research has also begun to document the relationship between metacognitive knowledge, specifically task knowledge, and planning and evaluating In his study Holec (1987) reports on the relationship between the change in learners' beliefs about language learning and the manner in which they planned their learning Thus, at the outset of a self-directed learning project, planning decisions were limited to the choice of proper materials, but as learners' understanding of the learning process and their role in it changed, their planning decisions expanded to the selection of learning activities and the setting of objectives Wenden's (1987a) study of L2 learners' theories about language learning includes three case studies which illustrate how these beliefs affected the priorities the learners set, their choice of strategies and their criteria for evaluating their learning Learners who believed using the language was the key to successful learning emphasized the need to learn to speak, selected practice strategies, and evaluated positively situations which provided an opportunity for oral communication In his case

study of how an L2 student coped with the listening and note-taking demands of regular college classes, Benson (1990) found that the student's approach to academic listening and note taking (e g trying to note down what he felt the teacher wanted) was influenced by his conception of learning as a reproductive process Finally, based on sociocultural theory, Gillette's study (1994) concludes that learners' views on the value of second language study shaped their goals and, indirectly, determined their approach—the degree of effort made and the kinds of learning activities selected

Task analysis

An essential component of efficient planning, task analysis refers to three sets of considerations learners engage in at the outset of learning to understand an assigned or self-set task and to determine how to approach it That is, they must determine what they are expected to learn from the task and compare this with their learning needs and goals, i e consider task purpose (Breen 1987) They must also classify the task—identify the nature of the problem it poses and consider whether it is similar to one they've already done (Paris and Byrnes 1989, Resnick 1989) Finally, they must assess a task's demands—consider how to best approach the task and the knowledge and skills they will need to do so (Glaser 1984, Groteleschuen *et al* 1990, de Jong and Simons 1992) [8]

To illustrate, let us consider the task analysis conducted by a hypothetical language learner of English who is taking a course in writing for foreign students

> The teacher asks the class to read an article on global warming and to summarize it Since this is a writing course, the learner wonders why he should read this article and how writing a summary will enable him to write the argumentative essay that is necessary to pass the course Still, he continues with the task He notes that this is an article on *global warming* and realizes this is a topic with which he is not familiar Further noting that he is expected to *summarize* it, he recalls that texts dealing with social problems often refer to the consequences of these problems and assumes these consequences would represent the key ideas he is asked to summarize He, therefore, decides to read to identify the effects of global warming At the same time, concluding that an article on global warming must be a scientific article and that it will, therefore, contain unfamiliar technical terms, he also decides to make a list of these terms as he encounters them Having made his plan, he feels that while the task may be tedious (he does not like scientific articles), it *should not be too difficult*
>
> Our learner begins by considering the *task's purpose*, questioning its relevance It may be assumed that the task does not conform to his *beliefs of how one should learn to write*
>
> *His discourse knowledge of expository texts*, evoked by the term 'global warming' in the task statement, is the basis for his *classification* of the reading as a (1) scientific text (2) about social problems.

His *discourse knowledge* is also used to assess the task's demands The task requirement, that he write a summary, evokes his *knowledge of summaries*, i e they are based on the key ideas of a reading. His knowledge *about expository texts dealing with social problems* leads him to expect that the article will describe the effects of these problems and so to conclude that these must be the key ideas that have to be found in order to write the summary His knowledge *about scientific articles* leads him to anticipate the use of technical terms and the need to understand them.

The learner's *person knowledge* is the basis for his realization that he is not familiar with this topic and that he does not like scientific articles. He uses his *knowledge of strategies* to choose list making as a means of dealing with unfamiliar technical terms he expects to find.

Finally, his *understanding of the task gained by this analysis* leads him to conclude that the task will not be difficult.

The illustration suggests that all three kinds of metacognitive knowledge can come into play at this critical juncture in learning Task knowledge is what prompts learners to initiate a task analysis to realize that it needs to be done It also dictates what must be done to complete the task, i e consider the task's purpose, its demands and how to classify it Person knowledge enables learners to recognize what they know and what they don't know (the learner was not familiar with the topic of the reading nor with technical terms that might be used to talk about global warming), what they like and what they don't like (he found scientific articles tedious) and strategic knowledge guides them in selecting strategies to deal with anticipated difficulties (he chose list making to deal with technical terms)

The illustration further suggests that domain knowledge is also necessary to completing a task analysis As noted earlier, domain knowledge refers to what the learner knows about the subject matter of the learning and the nature of the discourse through which this information is communicated In fact, our hypothetical learner recognized that he knew very little about global warming, the subject matter of the article, but he does use his discourse knowledge to determine the task's demands His knowledge of summaries and of expository texts about social problems leads him to conclude that he is expected to find main ideas and that these should be the effects of global warming His knowledge of scientific articles further leads him to anticipate the need to understand technical terms Thus, both metacognitive and domain knowledge are essential for learners to construct an accurate understanding of a particular task and it is this newly acquired (task) knowledge, which, then, guides and informs the manner in which they plan their learning, i e make decisions about how to proceed (See De Groot , Chi , Mayer, Linn, cited in Bransford and Vye 1989, Voss *et al* 1983, Glaser 1984, Schoenfeld and Herman 1982, Rohwer and Thomas 1989 on the importance of domain knowledge, and Bransford *et al* 1981, Nickerson *et al* 1985, Brown *et al* 1983, Perkins 1986 on the importance of metacognitive knowledge)

Monitoring

Briefly defined, monitoring consists of keeping track of how the learning process is going and taking appropriate measures to deal with difficulties that interfere with the process (Flavell 1981 272) Implicit in this description is an assessment of the cause of perceived difficulties Metacognitive knowledge is noted to be necessary to the monitoring process (Markman 1981) To illustrate, let us further consider the learner who has been asked to read the article on global warming

> Halfway through the task, he realizes that he has not really been able to find any effects of global warming in the reading, the main ideas he needs to write a summary Moreover, he feels the article is harder than he had anticipated He remembers that he was never good at science and concludes this must be the reason Moreover, he finds list making is not very useful and so discontinues the use of this strategy However, motivated by a general belief that one must persist even in the face of difficulty, he chooses to read each paragraph very slowly and to use contextual cues to infer the meaning of unknown terms

The illustration points to four ways, described in the literature, in which metacognitive knowledge plays a role in the monitoring process First of all, it is what constitutes the internal feedback, i e the state of awareness, which reveals how well learning is proceeding or can be expected to proceed (Butler and Winne 1995, Corno and Kanfer 1993, Howard-Rose and Winne and Zimmerman as cited in Butler and Winne 1995, Flavell 1979, 1981a) In the illustration, the learner becomes aware of the fact that he cannot find any effects of global warming in the reading, that the reading is harder than anticipated, and that list making is not useful [9] Secondly, metacognitive knowledge may be the basis for this internal assessment of comprehension (Brown *et al* 1983, Baker 1985, Weinstein and Rogers 1985) and/or of progress towards a goal (Paris and Myers 1981, Wong 1986, Brown *et al* 1983, Carver and Scheier 1990, Kitchner 1983) Thus, implicit in the hypothetical learner's recognition that he cannot discover the effects of global warming is his earlier assessment of the task's demands which had led him to conclude that this was the information he must find to write the summary Similarly, it is his earlier assessment about his ability to do the task (i e that it would be easy) which leads to the awareness that it is harder than he had anticipated Thirdly, metacognitive knowledge may suggest the reason for the problems revealed through this state of awareness As illustrated above, the learner remembers he has never been good at science Finally, learners' acquired metacognitive knowledge and beliefs can also be drawn upon to guide their decision making during this phase of the monitoring process They must decide how to respond to this internal feedback whether or not to maintain, revise, or reject earlier choices, whether to make new ones (e g Wellman 1985, Butler and Winne 1995, Corno and Kanfer 1993, Kitchener 1983, Flavell 1981a, Chinn and Brewer 1993, Paris and Myers 1981, Paris and

Byrnes 1989, Schommer 1990) The hypothetical learner decided to use a new strategy, drawing upon his strategic knowledge, and to persist even though it was hard, drawing upon his self-efficacy beliefs (i e person knowledge)

Monitoring can also lead learners to refine and expand their metacognitive knowledge (Wellman 1985, Zimmerman 1989, Butler and Winne 1995, Paris and Winograd 1990) As they monitor, they are prompted to examine the relationships among learning goals, means of achieving them, task outcomes and to accommodate their knowledge to what has been observed (Flavell 1979, 1981) Thus, realizing that list making (the means) which he had selected to facilitate understanding of technical terms (learning goal) was not helping him to understand (learning outcome), the hypothetical learner discontinued its use having learned that it was not an effective strategy (revision of strategic knowledge) Thus, in the case of monitoring, the relationship with metacognitive knowledge is reciprocal On the one hand, it is the basis for monitoring and, on the other, the knowledge generated by monitoring can be used to revise the learners' existing knowledge base

Transfer of learning

Transfer of learning refers to the application of acquired knowledge and skills used in a previous task to the completion of a present task When a learner who has learned how to guess from context while reading applies the same strategy to the comprehension of oral communication, learning is being transferred Learning transfer can take place at the outset of learning, as learners plan how best to complete a task, it can also occur while they monitor the implementation of their plan In learning transfer, metacognitive knowledge facilitates the appropriate choice of previously learned strategies to achieve learning goals and/or to deal with problems encountered during the learning The literature presents two views on the kind of metacognitive knowledge that is necessary to this process the motivational view and the methodological view

Motivational view According to this view, person and strategic knowledge are necessary for transfer It is assumed that

(1) Learners who approach a particular learning task will have acquired an understanding of a range of strategies that may be used to do it—task specific strategy knowledge
(2) They understand that effort is required to apply strategies and that well-chosen strategies may improve performance—general strategy knowledge
(3) Finally, they hold beliefs about their ability to control their learning, i e that success is the result of their efforts and not of an uncontrollable factor—person knowledge about self-efficacy

According to Groteluschen *et al* (1990), the strategies learners choose to do a task will be based on their specific strategy knowledge If a chosen strategy is

effective and learners feel it has improved the quality of their learning, their specific strategy knowledge is strengthened Additionally, the realization that a particular strategy can be effective will strengthen their belief about the effectiveness of strategies, i e general strategy knowledge, which, in turn, will strengthen their self-efficacy beliefs The learner will be more convinced that they can exercise control over their learning, thus reciprocally reinforcing their general strategy knowledge These reinforced beliefs about strategy use and self-efficacy, it is implied, will, then, make it more likely that learners will use strategies and, therefore, choose the successful strategy in another context when appropriate

Returning once again to the hypothetical learner, let us assume his decision to try to infer the meaning of unknown terms rather than make lists enabled him to comprehend a fair number of words He may, then, conclude that inferencing is a useful strategy and further realize that strategies can help him understand better as well as give him some control over his learning Therefore, the following week, when, once again, he is asked to read a text with many unfamiliar terms, he selects inferencing as the strategy he will use to comprehend these terms In other words, it is assumed that the effective use of a strategy can expand learners' strategic knowledge and/or re-enforce what they already know, thus motivating them to use strategies and, therefore, to transfer effective strategies to other contexts as needed (Groteluschen *et al* 1990, see Borkowski *et al* 1992 for similar views)

Methodological view On the other hand, according to the methodological view, strategic and task knowledge are necessary for the transfer of learned strategies and strategy instruction is the means of providing it To that end, it is recommended that strategy instruction (1) be informed (Brown and Palinscar 1982, Brown *et al* 1983, Baker and Brown 1984), (2) provide conditional knowledge (Paris, Newman, and McVey as cited in Paris and Byrnes 1989) and (3) promote mindfulness (Wong 1991) Informed training provides knowledge about the purpose of the strategy—what the expected outcome of using it will be Training provides conditional knowledge if it tells learners when a strategy can be used so that it is likely that they will use it not only in the training context but in a variety of other appropriate settings Finally, mindfulness is promoted when learners are taught to determine whether there are similarities between previous learning activities (or tasks) and the present task The task knowledge yielded by this comparison will, then, be the basis for determining whether the strategy applicable to a former task can be transferred in the present case (see Carrell 1989, Wenden 1991, Chamot and O'Malley 1993, Ellis and Sinclair 1989 for similar views on strategy instruction in FL/SL) To restate, when strategy instruction meets these three criteria, it is expected that learners will have acquired the strategic and task knowledge that will lead to the transfer of a learned strategy to a similar context

SIGNIFICANCE OF THE FINDINGS

This article has reported on a review of selected theoretical writings and research reports which aimed to determine the function of metacognitive knowledge in learning The review has shown that metacognitive knowledge is a prerequisite for the self-regulation of learning it informs planning decisions taken at the outset of learning and the monitoring processes that regulate the completion of a learning task, i e self-observation, assessment of problems and progress, and decisions to remediate, it also provides the criteria for evaluation made once a learning task is completed In addition, the review has shown that in some aspects of planning, i e the procedures that constitute task analysis, metacognitive knowledge is insufficient Domain knowledge plays an essential and complementary role Finally, the review has pointed to the distinct functions of metacognitive knowledge On the one hand, it is motivational—energizing the processes of self-regulation—while on the other, it is cognitively oriented—shaping and guiding these same processes Thus, the findings support the practice-based intuition of FL/SL language researchers and teachers who implicitly recognize the importance of knowledge about learning when they advocate that it be included in tasks that aim to help language learners learn how to learn

In addition , the insights about the function of metacognitive knowledge in learning provided by the review should enhance our understanding of three theoretically distinct views of second language acquisition and learning, each of which give the learner an active role in the learning process, namely learner strategies research and instruction, self-directed language learning, and sociocultural theory Learner strategies research and instruction is based on cognitive theory (cf O'Malley and Chamot 1990), while the theory underlying self-directed language learning is drawn from insights proposed in theoretical writings in adult learning and development (cf Holec 1981, Wenden 1987) Finally, Vygotskian perspectives of cognitive functioning and development provide the foundation for sociocultural theory (cf Donato and McCormick 1994, Lantolf and Appel 1994) Each of these approaches focuses on regulation in language learning though their descriptions of its origin, processes and/or scope vary In addition, in their writings, the role of knowledge is either implied or briefly referred to, but it is not explicitly linked to self-regulation

Learner strategy research and instruction

By describing how metacognitive knowledge functions in the self-regulation of learning, the review provides insights on the use of cognitive strategies in language learning At the same time, it points to an area of research needed for a better understanding of this aspect of self-regulation That is, most of the strategy research, thus far, has focused on documenting the learning strategies of successful learners, to a lesser degree, it has also sought to identify which

cognitive strategies may be used in the completion of specific learning tasks, e g finding the main idea, gap filling, and more broadly, in the execution of the different language skills, primarily reading and listening (e g Chamot 1987, O'Malley and Chamot 1990, Oxford 1990, Cohen 1990) However, as reflected by the very few studies cited in this survey, learner strategy research which has documented the link between learners' acquired metacognitive knowledge and the use of strategies is scant To restate, then, the survey expands our theoretical understanding of strategy use and points to an area that should be included as part of the learner strategy research agenda

Furthermore, the discussion of the role of metacognitive knowledge in the transfer of learning confirms and refines insights that have shaped FL/SL cognitive strategy instruction In contrast to the research on learner strategies, the literature that describes procedures for cognitive strategy instruction does recognize the importance of strategic knowledge, advising teachers to provide learners with knowledge about the utility of strategies and the conditions appropriate for their use (e g O'Malley and Chamot 1990, Hosenfeld 1981, Oxford 1990) The discussion of both the motivational and methodological views on the transfer of learning, which demonstrates that it is the possession of strategic knowledge which leads learners to use particular strategies, confirms the appropriateness of this methodological approach At the same time, it (the discussion) provides insights that should refine it, i e about the need for person knowledge to motivate learners to continue to use strategies and the key role of task knowledge in the transfer of learned strategies

Self-directed language learning

Theoretical writings about self-instruction (e g Dickinson 1987), and self-direction in language learning (e g Holec 1981) have identified planning, monitoring and evaluating as the skills that constitute self-directed language learning, and the literature in this field has concentrated on better understanding each skill It has specified the range of decisions that define planning e g clarifying needs, goal setting, prioritizing goals, setting objectives, defining content and progression (e g Holec 1981, Carver 1984, Holec 1985a, Huttunen 1986, Dickinson 1987, Oxford 1990, Cotterall 1995, Mueller-Verweyen 1995, Rubin 1995, Wenden 1991a, Kelly 1996, Thomson 1996) Initial attempts have been made to define the procedures and scope of monitoring (Rubin 1987, Oxford 1990, Eriksson 1993, Chamot and O'Malley 1994, Wenden 1991, Little 1991, Thomson 1996), and the processes and focus of evaluation have been delineated (e g Wenden 1991, Holec 1985a, Huttunen 1986, Little 1991, O'Malley and Chamot 1990, Westhoff 1993, Thomson 1996) However, as noted at the beginning of this article, there has been no attempt to delineate the function of metacognitive knowledge in planning, monitoring, and evaluating This review has provided for this lack illustrating and explaining how metacognitive knowledge comes into play in

the execution of these three skills for self-directed learning, including task analysis, a planning skill that had, heretofore, been ignored This is information that can enhance both the research and instruction in this area, signaling the need (1) to investigate the role of metacognitive knowledge in the use of self-directed learning skills and (2) to incorporate metacognitive knowledge in tasks that aim to help learners self-direct their learning

Sociocultural theory

Based on the work of Vygotsky, sociocultural theory views the social setting as the primary and determining factor in the development of higher order mental functioning (Lantolf and Appel 1994 1–32) Activity theory, which expands upon some of the themes introduced by Vygotsky, aims to clarify what the individual or group is doing in a particular setting, and activity, one of the three concepts that explains the theory, is defined 'as a socially determined setting, based on a set of assumptions about roles, goals, and means to be used by a participant in that setting' (Lantolf and Appel op cit 16) In other words, according to the definition, action which flows from a setting must be understood in terms of the goals, role and means that define it (i e the setting) However, it is the socially acquired assumptions, i e beliefs or knowledge, built into the setting and which may emerge through the interaction that takes place in it, which shape these components of a setting Thus, the definition appears to recognize the role of beliefs/knowledge in motivating human action, including, one may assume, the self-regulation of learning However, it is the setting or activity, including the effect of its interactional dimension, which some researchers choose to emphasize as the factor that shapes regulatory activity (cf , for example, Gillette 1994, Coughlan and Duff 1994) In these studies the knowledge/beliefs embedded in the setting or which emerge through the interaction that takes place in it is overlooked as a source of insight on learner's motives, goals and operations This review, on the role of metacognitive knowledge in the self-regulation of learning, highlights this variable that appears to be ignored and undeveloped in sociocultural theory

CONCLUSION

The preceding section has indicated, very generally, how insights yielded by the review can be used by those FL/SL teachers who make the provision of learner training an integral part of their language instruction The conclusion, therefore, will outline two general suggestions to illustrate the practical implications of the survey for extending the role of all FL/SL teachers in this manner

(1) The review suggests that teachers should try to gain an understanding of their learners' beliefs and acquired knowledge about language learning In other words, just as they will usually diagnose their students' level of linguistic proficiency

at the outset of a language course, they should also assess their knowledge and beliefs about language learning Through the use of surveys, oral interviews, and focus groups, they can develop a profile of the metacognitive knowledge of their students Depending on the questions that have been asked, they may determine how learners perceive the course content, e g writing, reading, grammar, tasks that are typically assigned their role in learning, or why some learners are actively and independently involved in their learning while others do not appear to take any initiative at all In addition, such information may be gathered during the course of learning, as needed Learners' views on problematic tasks or irremediable language problems can be sought to seek insight on specific difficulties experienced by a class as a group or by individual learners [10]

(2) Teachers should also aim to help language learners develop a more reflective and self-directed approach to learning *their new language* For the greater part, language instructors will view their goal as the provision of instruction that facilitates the development of linguistic autonomy However, this research suggests that learners also need guidance in improving and expanding their knowledge about learning so that they may also become more autonomous in their approach to the learning of their new language The following four procedures that define awareness raising activities for (metacognitive) knowledge acquisition may be used as a guide in devising tasks and materials for this purpose (cf Wenden 1997 for a more detailed description of each step), i e

(1) *elicitation* of learners' metacognitive knowledge and beliefs
(2) *articulation* of what has come to awareness
(3) *confrontation* with alternative views
(4) *reflection* on the appropriateness of revising, expanding one's knowledge

Thus, such tasks and materials should provide learners with an opportunity to acquire new concepts about language learning They should be encouraged to use these 'new' ideas to seek insights into how they learn and into the reasons for unsuccessful learning outcomes They can also be shown how some of these ideas can be applied to the development of solutions to learning problems Then, as their understanding of their language learning process is broadened, they can begin to use these new insights to experiment with different approaches to learning without guidance, i e autonomously—drawing upon solutions and knowledge that have been validated and looking critically at or even discarding what has not What will be significant, then, is that it is the learners who will be making the final decisions regarding how to learn more efficiently and how best to improve their learning outcomes [11]

(Revised version received February 1998)

NOTES

1 This is a revised version of a longer paper that was the basis for a plenary presentation, Learner Representations in Language Learning, given at the conference Autonomy 2000 The Development of Learning Independence in Language Learning, sponsored by the King Mongut Institute of Technology Thonburi and the British Council, Bangkok, Thailand 1996 The original, much longer version, appears in the conference proceedings

2 The first statement is from Brown *et al* as cited in Paris and Winograd (1990), the second and third are from Wenden (1987a)

3 See Alexander and Dochy (1994) for a review of the literature on and discussion of these distinctions

4 This definition is based on Alexander and Dochy's (1995) study of how adults distinguish between knowledge and beliefs They surveyed 120 adults—undergraduate and graduate students in the United States and Europe (primarily the Netherlands) and experts in the area of knowledge and beliefs

5 Since beliefs are understood to be a component of metacognitive knowledge, the latter term is sometimes used to refer both to knowledge and beliefs in the discussion that follows

6 The self-regulatory skills listed in the cognitive literature are quite varied, but in this article they will be referred to as planning, monitoring and evaluating, based on Brown *et al* (1983), whose seminal writings served to distinguish between knowledge about learning (metacognitive knowledge) and the regulation of learning (metacognitive strategies) In addition it is these three strategies that have been adopted for language learning in O'Malley and Chamot's (1990) taxonomy of language learning strategies

7 It should be noted that self-regulation is also key to the view of language learning proposed by sociocultural theory However a discussion of this perspective is not included in this survey because it is predicated on a distinct metaphorical understanding of mental activity and emphasizes the role of external/social factors in the development and exercise of self-regulation, in contrast to the internal ones, such as metacognitive knowledge At the same time, a few studies based on this perspective were included in the review as their data and/or conclusions appeared to be relevant to the topic under discussion (i e Gillette 1994 and Platt and Brooks 1994)

8 Task analysis appears to be similar to what is referred to as orientation by Vygotsky (see Appel and Lantolf 1994 443 for a description of what this latter notion entails and situation definition by Wertsch, cited in Platt and Brooks 1994 505)

9 See Platt and Brooks (1994 506–7), a study based on sociocultural theory, which includes learner narratives to show how speech is used to regulate learning In fact, some of these accounts can also serve to illustrate how metacognitive knowledge, in this instance as awareness of problems that impede progress, can emerge as learners monitor the completion of a language learning task, cf 8—awareness of not being clear about the task purpose, 9—of frustration, and 10—of not understanding what has been said

10 See Wenden 1991 and Oxford 1990 for different approaches to collecting data on students' learning processes and Wenden 1991 for a guide to analyzing and interpreting the data

11 For specific examples of existing approaches to the development of tasks and materials that go beyond simple awareness raising to help learners reflect upon and expand their metacognitive knowledge, see, for example, Ellis and Sinclair 1989 Wenden 1991, Rubin and Thompson 1994, Holec 1994, Donato and McCormick 1994, Victori and Lockart 1995, Dickinson 1997, Sturbridge 1997

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