A Study on Metacognition of College Teachers

Wen, Ya-Hui, National Taitung University, Taiwan

ABSTRACT

This study explored the manner in which teachers taught metacognitive skills to students and preservice teachers, and the manner in which they applied metacognition in their teaching. The participants included 21 college instructors (15 Americans, 6 Taiwanese). This paper presents the results of the transcribed tape-recorded interviews, which were assessed by the participants and subsequently coded, analyzed, and compared. The interview responses were coded using seven variables, as follows: the person (teacher, student), task, strategy, planning, monitoring, and evaluating. The findings indicate that instructors used 15 strategies in teaching students and preservice teachers, as follows: videotaping/tape recorder, thinking aloud, reciprocal teaching, asking to think, problem solving, mapping concept, writing, presenting, direct instruction, journal, discussing, modeling, reading books, questioning, and coaching. However, the instructors used fewer metacognitive strategies in their teaching. Metacognition in learning and teaching was suggested for teacher education.

Metacognition refers to the knowledge of people and control of their own cognition. Increasing the use of metacognition of teachers may increase their effectiveness (Marchant, 1989). Teachers may facilitate learning in their students by helping them to develop metacognitive skills. Teaching metacognitive strategies to students increases learning, comprehension, attention, motivation, and memory, and decreases learning disabilities (Bonds & Bonds, 1992; Calderhead, 1987; Cross & Paris, 1988; Jakab, 1999; Luke & Hardy, 1999; Palincsar & Brown, 1987; Salomon, Globerson, & Guterman, 1989; Swanson & De La Paz, 1998; Weinert, 1987; Wittrock, 1986). The use of metacognition by teachers can help them to be more effective by enhancing their planning, monitoring instruction, and evaluating instruction. Consequently, the development of metacognitive skills in teaching is crucial to teacher education because of its relation to improving the quality of teaching.

Theoretically, cognitive activity comprises both cognitions and metacognitions. Metacognition applies to task-related cognitive strategies. Although cognition and metacognition are not interchangeable, they operate in a correlated manner (Weinert, 1987). Brown (1987) defined metacognition as follows: “Metacognition refers loosely to one’s knowledge and control of one’s own cognitive system” (p. 66). Flavell (1979) defined metacognition as follows: “Metacognition refers to one’s knowledge concerning one’s own cognitive processes and products or anything related to them; metacognition also refers to the active monitoring and consequent regulation and orchestration of the processes in relation to the cognitive objects on which they bear, usually in the service of some concrete goals or objectives.” Flavell (1979, 1987) stated that metacognition consists of metacognitive knowledge and metacognitive experiences or regulation. Metacognitive knowledge refers to acquired knowledge about cognitive processes, which can be used to control cognitive processes. According to Flavell, metacognitive knowledge includes three categories, that is, knowledge of person variables, knowledge of task variables, and knowledge of strategy variables.

Blakey and Spence (1990) indicated that metacognition is thinking about thinking, knowing what we know, and what we do not know. Just as the job of an executive is management of an organization, the job of a thinker is management of thinking. Blakey and Spence proposed that the basic metacognitive strategies
are as follows: (a) connecting new information to former knowledge; (b) selecting thinking strategies deliberately; and (c) planning, monitoring, and evaluating thinking processes. In summary, the definition of metacognition includes two aspects, that is, knowledge of cognition and regulation of cognition.

TEACHING METACOGNITION

Previous studies indicated that teaching metacognition can help to improve reading and mathematical problem solving (Desoete et al., 2003; Fortunato et al., 1991; Garofalo, 1987; Mevarech, 1999; Pugalee, 2001). Clinical psychologists have successfully helped their patients to gain control over thoughts on illness and cognitive self-consciousness (Thompson, 1981; Wells & Purdon, 1999). Effective modes of teaching metacognition in the classroom have been developed (Baird & White, 1996; Beyer, 1987, 1997; Costa & Lowery, 1989; Driscoll, 2000; Hewson, 1996; Marzano, 1998; Meichenbaum, 1986; Persichtite, 1993; Pintrich, 1990).

Furthermore, Beyer (1987) stated that thinking about thinking involves engaging in abstract processing or other abstract processes; it is closely related to the formal abstract thinking stage of a person. A number of teaching strategies have been proposed to enhance metacognition (Costa & Lowery, 2003; Leat & Lin, 2003). Costa and Lowery (2003) indicated that these strategies can be applied to vocational education, physical education, algebra, or reading skills. Teachers can promote the metacognition of learners by using these strategies and similar instructional techniques, such as strategy planning, question generation, conscious selection, differentiated evaluations, taking credit, outlawing “I can’t,” paraphrasing or reflecting on students’ ideas, labeling students’ cognitive behaviors, clarifying students’ terminology, role playing and simulations, maintaining journals, discussing and evaluating thinking abilities admired in other people, and modeling.

Leat and Lin (2003) stated that the roles of teachers included the use of stimulating strategies in teaching, attending to groups and individuals, encouraging students to ask questions, collating ideas, providing heuristics and alternative representations, promoting and managing discussion, making students explain themselves, providing feedback, establishing connections, and communicating the purpose of the lessons. In summary, teachers can use several metacognitive strategies to enhance the learning of students.

Metacognition: teacher thinking and education metacognition and teacher thinking

Peterson et al. (1978) investigated teachers who think aloud regarding their planning before teaching an instructional unit. They found that frequent decisions were first about the subject matter. Second, the instructional process included intended student activities, planned teaching strategies, activities, and instructional objectives. The plans of teachers influence interactions in the classroom, the selection of materials, and the arrangement of the physical environment of the classroom. Armour-Thomas (1989) stated that the plans of teachers influence their perceptions and judgments of the objectives of instruction, the learning experiences they design for their students, and the procedures and resources they use for organizing and managing instruction.

Clark and Peterson (1986) reported that teachers make an interactive decision every two minutes on average. Armour-Thomas (1989) stated the teachers must be aware of and be prepared to modify their preplanned instructional activities when teaching. Peterson and Clark (1978) found that teachers who were concerned about the instructional process during planning more frequently changed the instructional process in response to student reactions than teachers who did not attend to the instructional process in their planning. Peterson and Clark also indicated that teachers must use the classroom behavior of students as
environmental cues to evaluate whether students understand the lesson and appropriately participate in the learning. An effective metacognitive teacher must be knowledgeable of “when” and “how” to enable effective and efficient execution of the instructional task (Armour-Thomas). In summary, teachers require metacognitive skills to promote the teaching effect before, during, and after teaching.

**Metacognition and teacher education**

Prior studies indicated that experienced teachers can think ahead, plan, present, and assess hypotheses about students and their own teaching behaviors, and reflect metacognitively on their own thinking and teaching processes (Clark & Peterson, 1986; Peterson, 1988; Pintrich, 1990; Shulman, 1986). Pintrich (1990) indicated that teachers must continually monitor and regulate their teaching behavior as they work with the students. The ability of teachers to reflect and think about their own teaching is a crucial part of self-regulation. The knowledge of teachers about themselves, such as self-schemas and metacognitive knowledge of personal variables, is essential in relation to their content knowledge, actual teaching behaviors, and teaching effects.

Zohar (1999) indicated that courses that prepare teachers for instruction of higher order thinking must address the issue of metacognition of thinking skills. Ojanen (1996) stated that the central factor governing the effect of professional development on classroom teaching is the ability of teachers to reflect on their practice. Furthermore, Peterson (1988) emphasized that thoughtful professional teachers must have self-awareness of their cognitions and be able to reflect on their own thoughts and actions when they attempt to act on their knowledge in their classroom teaching.

To guide the development of reflective teaching, Gunstone and Northfield (1992) found substantial conceptual changes in teacher education regarding approaches to promote conceptual change and conceptions of metacognition. Education students must receive instruction regarding “when” and “where” a teaching strategy is most effective, the reason that it works, as well as the reason for which it may be more successful in an actual condition (Marchant, 1989).

In summary, metacognition in teacher education is a crucial issue. However, insufficient empirical research has been conducted on the use of metacognition by teachers. This qualitative study explored the manner in which college teachers use metacognition in their teaching. The research questions were as follows: Do teachers know what metacognition is? Do teachers see metacognition as important? In what ways do teachers feel metacognition is important for teaching education? How do teachers teach the students and preservice teachers to develop the metacognitive skills?

**METHOD**

**Samples**

The participants were instructors who teach at two universities; one university is in the mid-United States, and the other university is in southeastern Taiwan. Instructors refer to people who teach courses at the college level, regardless of rank. This study included a total of 21 participants (15 American instructors and 6 Taiwanese instructors). The total included 12 males and 9 females, including 5 professors, 3 associate professors, 4 assistant professors, 4 instructors, and 5 assistant teachers. The mean age was 46, the age range was 23 to 61 (md = 48), the mean number of years of teaching was 16 years, and the range was from 1 to 37 (md = 16). One American instructor did not provide demographics.
Instrumentation
This study used interviews to collect data from college teachers; the interview questions were as follows: 1. Have you ever heard of metacognition? Would you please describe it? If they had never heard of it, the researcher provided a definition. An A4 paper presented the definition of metacognition as follows: “Metacognition refers to a person’s conscious knowledge about his/her cognition and the person’s conscious control of this cognition to assess further cognition” (Lupart, 1984). 2. How is metacognition important for a teacher when he or she is teaching? 3. Do you feel that metacognition is important in teaching education? Why? 4. How do you teach metacognitive skills to your students to improve their learning? 5. How do you get preservice teachers to examine and develop metacognitive skill? 6. How do you apply metacognition in your own teaching? 7. When you teach, what is important to you? 8. What are you thinking about when you are teaching? (e.g., content, teaching strategies, students’ response, your emotion or students’ emotions, and evaluating students.) 9. Before you teach, what do you usually do? 10. What do you think about before you teach? 11. After you teach, what do you usually do? 12. Is there anything you would like to tell me? Topics 6, 7, 8, 9 and 10 were designed to answer Question 5. Finally, the topic of demographic information included age, gender, years teaching, and courses taught.

Procedure
Each interview lasted for no more than one hour. Each interview was conducted individually in the instructor’s office. Data were transcribed verbatim and analyzed based on the metacognition of the college instructors; however, each participant conducted a transcript review before it was analyzed. Before the researcher interviewed the Taiwanese instructors, the interview topics were translated into Chinese by two professors from Taiwan.

Analyses
The responses were coded and analyzed using seven variables, as follows: the person (teachers, students), task, strategy, planning, monitoring, and evaluating. Each variable is defined as follows: Person refers to knowledge about the person’s own thinking or that of others, including “Teacher” and “Student” variables. Task refers to knowledge differs for each performance, which has a different type of cognitive demand. Strategy is knowledge about cognitive and metacognitive strategies to enhance learning and performance (Driscoll, 2000; Flavell, 1979). Planning refers to setting a clear goal, a plan for achieving that goal, and predicting the desired results. Monitoring involves referring to the plan and anticipating appropriate future moves. Evaluating involves assessment of the process in achieving the goal, and the product of this process (Beyer, 1987; Lenz, Clark, Deshler, & Schumaker, 1988).

RESULTS AND DISCUSSION

College teachers define metacognition
It was crucial to determine whether college teachers were aware of metacognition. All of the participants heard of metacognition. A total of 52% of Taiwanese and American instructors responded to one dimension of the definition, “Awareness of cognition,” and 43% responded to two aspects of the definition, “Awareness of cognition” and “Monitoring one’s cognition.” Fewer participants responded to “Awareness of cognition” and “Monitoring one’s cognition” than those who responded to “Awareness of cognition”. An American female instructor did not know the definition of metacognition, although she heard of it. Brown (1987), Flavell (1979), and Lupart (1984) indicated that metacognition refers to a
person’s awareness and control of his/her cognition. The results indicated that a larger number of the participants responded to “Awareness of cognition” than “Awareness of cognition” and “Monitoring one’s cognition.” Therefore, it is feasible to discuss the appropriate definition of metacognition with college teachers.

A total of 67% of Taiwanese instructors responded to “Awareness of cognition” and “Monitoring one’s cognition,” whereas 60% of American instructors responded to “Awareness of cognition.” The Taiwanese instructors described the definition more appropriately than American instructors. The Taiwanese instructors were convenient samples, and were selected from a college that prepares elementary school teachers, whereas the American instructors were a sample from a general university. The Taiwanese participants taught “Educational Practicum” classes; therefore, they routinely practice the use of metacognition.

The importance of metacognition to college teachers when teaching

The highest response (21%) of Taiwanese and American instructors was “Teacher.”. The examples of the responses are as follows: “Teachers must think hard”; “Teachers must understand themselves”; “Teachers must be aware of their own thoughts, emotions, and behaviors”; “Teachers must understand their own teaching processes”; “Teachers must think about their own thinking”; and “Teachers must be aware of conscious abilities and anxiety levels when teaching.”

An American instructor, Bob, who had 37 years of teaching experiences, said that metacognition is crucial to the teaching process because it is something that must be done before, during, and after instruction. A Taiwanese instructor, Hale, defined teaching as “teach others how to learn,” and stressed that, in conscious learning, a person must be aware of his/her cognition and metacognition, and must know what to do and learn, or what to learn and how to learn it. A person must determine the method or strategy to use and recognize the manner in which he/she learnt, and what was learnt or not learnt Hale suggests that every teacher must use metacognition in the classroom to help students to learn and enable them to conduct independent learning in the future.

These participants argued that metacognition is crucial for a teacher when teaching.

The importance of metacognition in teacher education

The highest response (22%) on the importance of metacognition in teacher education among Taiwanese and American instructors was “Student.”. The examples of responses were as follows: “Interaction between the teacher and students is crucial”; “We need to teach students to act and think”; “Conscious learning and independent learning are crucial for students”; “We need to think about how students learn and be aware of the effects on students.”

An American instructor, Gill, said that it would be helpful if metacognitive skills were taught to students early and if they learned to apply these skills. He did not learn metacognitive skills until his educational psychology class in graduate school. Knowing these skills helped him to improve as a student. Conversely, a Taiwanese instructor, Paul, did not think that metacognition was important in teaching. He thought that the problem was how often we can jump out of ourselves and be aware of what we are thinking about at that time, and monitoring and regulating our thinking, regardless of what those metacognition theorists describe.

According to these two participants, it is crucial to know when to teach metacognition in teacher education and the manner in which to apply metacognition in teaching.
College teachers teach metacognition to students and preservice teachers

The researcher combined college teachers who taught students and preservice teachers to use metacognitive skills; 15 strategies were used, as follows: Videotaping/Tape recorder, Thinking aloud, Reciprocal teaching, Asking to think, Problem solving, Mapping concept, Writing, Presenting, Direct instruction, Journal, Discussing, Modeling, Reading books, Questioning, and Coaching. Examples of a number of participants are as follows:

An American instructor, Jack, said that he taught metacognitive skills directly and practiced them in class. An American instructor, June, said that she encouraged graduate students to keep a researcher journal. The journal provided a method to review their writing and think about what they had done. A Taiwanese instructor, Paul, suggested thinking aloud and embracing what they were thinking at the time to help to identify their thinking process. He also noted that, in reciprocal teaching, teachers show the thinking process and the students learn from the teachers.

A Taiwanese instructor, Lee, noted that he modeled, and asked his students to read books on metacognition, such as Reflective Teaching by Shulman & Schön, which presents ideas of reflection in action. Furthermore, he required his students to write down their thinking after they practiced teaching; they also listened to the recorder and reflected on the thinking and teaching. In addition, he suggested video or audiotaping of teachers who work in small groups and discuss each other’s work to challenge one another’s thinking, and to encourage them to think about their teaching in a broader context with a more diverse perspective.

A Taiwanese instructor, Hale, stated that he taught metacognition in his calligraphy class. Before students wrote, they read and recited the pattern of calligraphy. During writing, students compared their writing to the pattern and needed to feel the direction of the stroke. They attempted to determine the required stroke. After writing, he asked the students to judge the strengths and weaknesses of their strokes, structure, and arrangement, and to attribute their strengths and weaknesses. In addition, he asked students to map concepts of the term curriculum to organize the learned concepts.

A Taiwanese instructor, Wu, mentioned two strategies. One strategy was that he taught students to take notes. At first, he wanted students to understand the structure of the material and subsequently focus on the details of the material. The other strategy was to teach students to prepare a lesson plan and understand the thinking processes before, during, and after their teaching to enable them to more clearly understand their writing. In addition, he said that, if metacognitive skills are problem solving, he would let students know the whole process of problem solving, and the manner in which to monitor and control these processes. He provided a number of examples to enable preservice teachers to understand the problem solving processes of more mature teachers; for example, The Day School Begins (Huang, 1989), is a teaching example.

Several strategies, such as direct teaching, maintaining a researcher journal, thinking aloud, reciprocal teaching, reading books, modeling, video or audio taping lessons and discussing them in small groups, and problem solving were similar to those of previous studies (Beyer, 1997; Costa & Lowery, 1989; Marzano, 1998). For example, Beyer (1997) suggested that thinking aloud is a method of making a person’s own thinking “visible” and explicit. Modeling is the act of providing an example that can be imitated by others, and telling the students at each major point along the way the options available at that point in the procedure (Beyer, 1997; Costa & Lowery). Marzano indicated that journal writing can be used for self-analysis and understanding the metacognitive system.

Niemi (2002) indicated that quality of learning is also dependent on the learners’ abilities to hold their learning orientation, develop inquiring skills, and reflect on and control their own learning processes.
Responsible learners are metacognitive, strategic, and high achievers (Schellenberg et al., 2011). Hacker et al. (2009) indicated that successful students take charge of their own learning. Taking charge requires students to be aware of their learning, to evaluate their learning requirements, and to generate and use strategies to meet their requirements. In summary, metacognitive strategies have a considerable influence on the manner in which students and preservice teachers learn.

**College teachers apply metacognition in their own teaching**

The highest response (26%) of Taiwanese and American instructors was “Strategy.”. The eight strategies that Taiwanese and American instructors responded to were as follows: “Thinking aloud” (25%); “Modeling” (19%); “Examples,” “Questioning,” and “Thinking” (13% each); and “Writing,” “Discussing,” and “Direct instruction,” (6% each). Four teaching examples of the participants are provided as follows:

An American instructor, Jay, said that he tried to develop superior speech patterns and eliminate stutters and ums; he said that he had the habit of saying “you know.” He has worked to become aware of when he says those things and reduce these speech patterns. Most of the time, he is more worried about what the students are thinking, as opposed to what he is thinking.

A Taiwanese instructor, Hale, stated that, before teaching, he asked himself if he had prepared well. During teaching, he monitors himself to determine whether he is applying this theory effectively. He does not reflect after teaching; however, in the classroom, he is aware of the things that did not work effectively.

A Taiwanese instructor, Lee, indicated that he models his methods of thinking for his students, and often thinks aloud about his teaching in front of his students. Furthermore, he wrote about his planning and teaching; for example, he published a paper (Wang, 1992) about how he learned to teach the field experiences course at Taitung Teachers’ Junior College.

A Taiwanese instructor, Wu, thinks aloud to his students. He tells them the manner in which he processes the information for his teaching or his key points and the reason for which he emphasizes these facts when he summarizes the class period. In addition, he uses several examples to teach his students to use their metacognitive thinking. In particular, he taught Gagne’s Nine Events of Instruction through the model he developed.

The researcher found that the point of views of the participants, such as Jay, Hale, Lee, and Wu, provided excellent examples of the participants applying metacognition in teaching, as well as teaching metacognitive skills to the students to improve their learning. However, fewer college teachers used metacognitive strategies in their own teaching than when teaching students and preservice teachers. Further studies may be required to support the idea that metacognition can be applied to teaching to improve teaching quality. In the researcher’s opinion, college teachers should learn more about metacognitive skills in their own teaching. It is beneficial for student learning and qualitative teaching.

**Metacognition during teaching**

The highest response of each comparison group (Taiwanese and American instructors, male and female) was “Student.” The examples of responses were as follows: students’ requirements, students’ responses, interaction, meaningful learning, engage in exercises, respect, individual differences, be thoughtful, try hard, direct their own teaching, caring, write well, express well, successful in the course, interest, and applicable. In this case, “Student” was the crucial variable in teaching among all comparison groups.

A Taiwanese instructor, Lee, noted that the requirements of students is his first priority. He pays considerable attention to the students’ responses. Furthermore, he said that a professional knowledge base
is also crucial: the trend or the progress of knowledge in recent years, as teachers and researchers envision future progress in this field, and social justice with society and the historical responsibility.

A Taiwanese instructor, Wu, instructed his students to learn how to think and act as mature skilled teachers. Generally, through modeling and providing examples, students can imitate and consciously think about their own thinking processes; gradually, the process of metacognitive thinking becomes automatic. He stressed that metacognition is the second order of thinking, the primary order of thinking is cognition.

**Thinking when teaching**

The highest response of each group (Taiwanese and American instructors, female and male instructors) was “Student.” The examples of responses were as follows: students’ responses, students requirements, emotional reactions, hidden curriculum, interacting, engaged, understanding, interest, feeling, faces, listening, diverse learning styles, sufficient challenges, and support.

An American instructor, Fay, stated that she thought about her plan for the class. She thought about the content, watching the students’ faces, listening to them, and trying to remember their names. She considered the amount of time in the class and how much material she must cover. She thought about what the students understood from the various concepts.

An American instructor, June, said that, when she asked a question, she waited patiently, allowing students to think carefully about their answers.

**Metacognition before teaching**

The highest response of each group (Taiwanese and American instructors, male and female instructors) was “Planning.” Examples of responses are as follows: lesson plan, collect information, rehearse in your mind, outline, handouts, write outline for the discussion, create learning environment, overhead projector, copy supplemental material, make notes, review, review activities, syllabus, and be prepared for class the day before.

A Taiwanese instructor, Wu, said that, before teaching, he analyzes the teaching material and confirms the content of the lesson and its importance to the students. An American instructor, June, maintains office hours before she teaches to enable commuter students can make appointments with her before they attend classes. She prepares for class the day before and arrives in the classroom a few minutes early.

**Thinking before teaching**

The highest response of each group (Taiwanese and American instructors, male and female) was “Task.” Examples of responses are as follows: teaching content, sensitive material, teacher standards, what the students must know, varies, particular goals, different stories, books, and make connections.

A Taiwanese instructor, Lee, thinks about how to conduct the course. An American instructor, Ina, imagined her appearance and ensures that she dresses appropriately. A Taiwanese instructor, Sue, stresses cleanliness and prepares herself for class. Taiwanese instructor, Wu, simulates his class; he imagines and reflects the responses of his teaching. A number of materials, especially, are more sensitive than others; for example, a single parent family, a handicapped student, or sex education. He has a number of concerns, such as: if I worry about hurting some people with this material, and if this material is offensive to them, how can I handle this matter?
Metacognition after teaching

The highest response of each group (Taiwanese and American instructors, male and female) was “Evaluating.” The examples of responses were as follows: self-criticism, assess teaching plan, think about the process, correct the students’ papers, review the manner in which the class was conducted, and identify the things that worked effectively.

An American instructor, June, mentioned that she usually remains in the classroom for 15 or 30 minutes after class to answer questions from students. This is planned as a part of her teaching time. An American instructor, Tim, stated that he occasionally discusses the manner in which to solve learning problems with the students. Six female instructors responded with “take notes” after teaching. In particular, a Taiwanese instructor, Lee, prepares for the following session and tries to add further information on content that was not sufficiently clarified in the previous session. A Taiwanese instructor, Wu, indicated that, after teaching, he reflects on his whole teaching process. He thinks about “How do I feel about my teaching? Am I satisfied with my teaching? Where do I feel satisfied or unsatisfied? Why do I have this feeling? Where and how do I need to revise my lesson plan for the next session?”

Finally, three participants provided their perspective of teaching. A Taiwanese Instructor, Lee, mentioned that he views teaching in three stages, as follows: before entering the classroom, the teacher must plan; in the classroom, teachers must act and think; after teaching, teachers must reflect. A Taiwanese instructor, Wu, suggested that the optimal approach is to use examples to help students to become familiar with metacognition. For example, Dibs- In Search of Self” (Axline, 1967) shows how Sullivan taught Helen Keller, and examples from Analects. For example, Confucius said, "When a person should be spoken with, and you don't speak with them, you lose them. When a person shouldn't be spoken with and you speak to them, you waste your breath. The wise do not lose people, nor do they waste their breath.” Wu stated that metacognition is a high-order mental skill in the process of preparing a teacher. Vygotsky (1978) stated that an older experienced person or a young competent person can provide models through the process of modeling. The older experienced person and younger competent person thinks out loud during their thinking processes, and the new learner will clearly understand; therefore, they will have this high-order skill. They will gradually reflect their cognition or write down their thinking processes. He emphasized that, in teacher education, students must be trained to think and act like expert teachers.

A Taiwanese instructor, Hale, stated that he learned to teach from an instructor, Wu, by auditing 10 classes. He taught how to instruct calligraphy and how to teach students to read and write in classes. It is crucial to understand the theories of teaching and metacognition; however, understanding the manner in which to apply these theories in practical teaching is also crucial.

The results showed that teaching the “student” was a crucial variable to most participants. They considered the students’ responses. Before teaching, most of the participants who responded conducted lesson planning, and all participants who responded focused on the “task.” After teaching, most of the participants responded to evaluating, that is, reflecting on the strengths and weaknesses of their own teaching. According to Flavell (1979, 1987), metacognition includes knowledge and regulation of cognition. Knowledge about cognition consists of person variables, task variables, and strategy variables. A metacognitive teacher must be aware of his/her self or the students’ thinking (person variables), knowledgeable about the difference of partial knowledge for teaching, which has different types of cognitive demands (task variables), as well as knowledgeable about cognitive and metacognitive strategies (strategy variables) to enhance student’s learning and performance. Three Taiwanese instructors, Lee, Wu, and Hale are experts in metacognitive teaching, and effectively practice this type of teaching theory.
In summary, previous studies identified several efficient areas to apply metacognition, including the provision of comprehensive monitoring strategies and controlling aversive events in life. In teacher education, teaching the students to use metacognitive skills to improve their learning, in addition to a teacher’s teaching, will continually enhance teaching quality.

CONCLUSIONS

All of the participants were aware of metacognition. It is crucial to discuss the appropriate definition with college teachers, because fewer participants defined metacognition as “Awareness of cognition” and “Monitoring a person’s cognition” than those who defined it as “Awareness of cognition.”

This study found that college teachers recognize the importance of metacognition in their teaching and teacher education. The researcher identified 15 metacognitive strategies that instructors use to teach students and preservice teachers, including videotaping/tape recorder, thinking aloud, reciprocal teaching, asking to think, problem solving, mapping concept, writing, presenting, direct instruction, journal, discussing, modeling, reading books, questioning, and coaching. Fewer instructors used metacognitive strategies when teaching students and preservice teachers. Further studies may be required to support the idea that metacognition can be applied to our own teaching to improve teaching quality.

A teacher who is aware of his/her teaching content and his/her strengths and weaknesses can understand the students’ level of learning, and he/she must plan before teaching. Teachers must be conscious and monitor their own teaching. This includes the manner in which the teaching process is developing, the efficiency of their teaching strategies, the quality of interaction with students, understanding their own teaching and feelings, as well as the students’ thinking and feelings, and changing teaching strategies if required. Teachers must also evaluate the students’ learning and their own teaching. This study verified that metacognition is feasible in the classroom.

An efficient teacher must be aware of each student and understand himself/herself, and know the content knowledge and pedagogical knowledge for each teaching task before, during, and after teaching. It would be beneficial to the learning of students if teachers understand metacognition and the manner in which to apply proficient metacognitive skills in their teaching. If a teacher does not understand metacognition, a metacognitive program would be required.

REFERENCES


