國立虎尾科技大學學報　第二十五卷第三期 （民國 95 年九月）：105-126

An Ethnographic Study on Expert Teachers' Cognition

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ABSTRACT

This study describes and explains four expert reading teachers' thinking and interactive thoughts within the social and cultural environment of freshmen English classroom. It aims to outline how features of the classroom may be mentally represented by the expert teachers, and how the expert teachers perceive and interpret the classroom events. To understand the meanings of expert teachers' decision-making and interactive thoughts, qualitative procedures were utilized to analyze the data, which contains field notes of participant observation, ethnographic interviewing transcripts, and pertinent written documents. Results indicated that better developed knowledge structures and effective classroom strategies, along with on-going assessments and reflections, constituted the expert teachers' schemata, which in turn increased their skills in processing information in the unpredictable classroom world and led to their expertise in reading instruction. Four major themes that elaborate the expert teachers' cognitive processes in teaching are: (a) network of teachers' BAK (beliefs, assumptions, and knowledge), (b) mental representation and information-processing, (c) schemata about students, and (d) knowledge-in-action. Although the results may not be generalizable to other teachers, they provide a holistic understanding of and fruitful insights for reading instruction.

Key words: expert teacher, teacher's thinking, teacher's decision-making, mental representation

INTRODUCTION

The concepts in cognitive psychology have provided potentially powerful tools for studying teaching. Since the 1970s, fruitful research on teacher thinking and the related field of cognitive psychology has led to the realization that teaching is a complex and cognitively demanding activity. Taking a cognitive perspective, researchers assume that underlying teaching behaviors are complex cognitive processes and that planning and interactive decision-making are central aspects of teacher cognition.

Teacher thinking, planning and decision-making constitute a large part of the psychological context of teaching and substantially influence teacher behavior in the classroom (Clark & Peterson, 1986). In exploring the teacher's decision-making, researchers have also addressed the question of the content of teacher's interactive thoughts and antecedents of teacher's interactive decisions (Borko & Shavelson, 1990). In other words, researchers have attempted to "map" the interactive decisions of teachers and describe the factors influencing teachers' interactive decisions and to investigate the relationship between teachers' interactive thoughts and decisions, teachers' behavior, and student outcomes (Clark & Peterson, 1986). Through process-tracing studies, these researchers have provided context-specific descriptions of teachers' interactive teaching (Bailey, 1996; Graden, 1996; Johnson, 1992a; McMahon, 1995; Smith, 1996).

However, in Taiwan, limited research has been conducted on the expertise of English teachers in technological institutes. This gap is particularly notable, as a number of researchers' consistent findings have shown that technological institute students' English reading proficiency needs to be improved (M. S. Lin, 1992; Ou, 1997). While the Ministry of Education has yearly invested enormous sum of money in the projects trying to enhance technological institute students' English ability, efforts also have to be made to explore how expert teachers perceive and subsequently represent educational events, and make deliberate decisions to implement effective teaching in the classroom. Thus, the purpose of this study is to describe and explain four expert reading teachers' thinking and interactive thoughts to outline how features of the classroom may be mentally represented by the expert teachers, and how the expert teachers perceive and interpret classroom events. The descriptive data collected from multiple methods and process-tracing in this study should be able to provide a realistic view of the realities of classroom life and enhance novice teachers' reflectivity in reading instruction.

LITERATURE REVIEW

This study set out to outline how features of the classroom may be mentally represented by the expert teachers and how the expert teachers' decisions influenced their teaching practices in reading classrooms. In the following section, an overview of reading instruction in technological institutes, research on teachers' thinking, beliefs and practice, and studies of expert and novice teachers' decision-making is presented.

Reading Instruction in Technological Institutes/ Universities

Reading instruction constitutes the major part of the required English course (or Freshmen English) in a number of technological institutes in Taiwan (Joe & Hung, 1998). One of the major functions of the required English course is to equip students with the ability to cope with their academic reading, including reading English textbooks of their content area. However, despite the rapid development of

technological institutes/ universities, the students' average English proficiency for the academic requirement still falls significantly behind that of students in the general education system (Ou, 1997). According to Huang's (2001) investigation, a lack of vocabulary knowledge significantly impeded students from comprehending texts. In addition, the gap between technology-freshmen's vocabulary size and the words used in their English-printed textbooks is noticeably large (Huang, 2004).

In fact, several efforts have been made to explore the characteristics of reading instruction in technological institutes and to provide solutions which will lead to effective teaching of reading (e.g. Huang, 2001; Hung, Joe, & Wu, 1998; Joe & Hung, 1998; Yang, 2001). For example, Joe and Hung (1998) identified three themes which featured the English teachers' reflective thoughts with respect to reading instruction at technological institutes: the back-to-basic instructional design, the teacher as a facilitator, and students' responsibility for more active learning and more involvement.

With regard the teacher's and students' roles, Huang (2001) suggested that reading teachers should guide students to infer the meaning of the vocabulary from context clues and to increase their word-solving strategies. Moreover, extensive reading should be emphasized because students can increase their knowledge of the world, broaden their horizon, enhance cultural awareness, and therefore consolidate their vocabulary knowledge. In the same vein, Yang (2001) emphasized that students should be guided through teacher intervention to take risks, to learn from error trying, to develop their own strategies, and to foster self-monitoring and self-correction abilities.

As far as reading strategy is concerned, Ko (2002), in an exploration of reading strategy instruction and students' motivation to read in technology-oriented colleges, found that teachers can contribute to a positive attitude toward reading by using English as a means of interaction and by engaging students in activities such as small group discussion, group presentation and role play. Likewise, Shen (2005) investigated the non-English majors' strategy use, context use and error pattern in word inferring, and revealed that learners who focused on reading as interactive use of various strategies in processing unknown words tended to be more effective readers.

Teachers' Thinking, Beliefs, and Practice

Research on teachers' cognitive dimensions has emerged from within the psychological research tradition and became well entrenched in the late 70s (Clark & Yinger, 1979; Doyle, 1978; Shulman, 1986). Through the lens of cognitive psychology, a teacher was viewed as a decision-maker who bases his or her instructional decisions on his or her existing knowledge and beliefs. Also, classroom processes were described in terms of the interrelationships of teachers and students' cognitions and behaviors (Calderhead, 1996). Both teachers' and students' cognitions were acknowledged in a process of continuously interpreting and making sense of classroom life and influencing classroom behavior.

Teacher thinking, planning and decision-making constitute a large part of the psychological context of teaching and substantially influence teacher behavior in the classroom (Clark & Peterson, 1986). In the context of teaching English as a second or foreign language (TESL or TEFL), researchers also begun to recognize the importance of understanding language teacher's cognitions (for a more detailed historical account, see Freeman, 1996a, and Woods, 1996). Research inquiry centered on teachers' perceptions—their reasoning, beliefs, and intentions.

As extensions to the research agenda in teacher

thinking developed, reports of teachers' thinking provided a richer understanding of teaching. For example, Woods (1996) proposed that "teachers 'interpret' teaching situation in the light of their beliefs about the learning and teaching of what they consider a second language to consist of; the result of this interpretation is what the teacher plans for and attempts to create in the classroom" (p. 69). Johnson (1999) further argued that teacher beliefs act as a filter through which teachers make instructional judgments and decisions. In an exploration of how the teacher's underlying thinking and beliefs shape the processes and interactions that occur, Burns (1996) indicated that teachers' thinking cohered around three interconnecting and interacting contextual levels, namely, institutional focus, classroom focus, and instructional focus. These interconnecting contextual areas operated in the classroom and influenced classroom practice.

Research that specifically focused on ESL/EFL teachers' beliefs about reading and reading instruction aimed to explore teachers' beliefs and compare them with instructional practices or with students' beliefs. For example, in an attempt to characterize ESL teachers' theoretical beliefs and to investigate the relationship between beliefs and practices, Johnson (1992b) found out that literacy instruction for non-native speakers of English was consistent with the teachers' theoretical orientation. Graden (1996), on the other hand, explored how teachers' beliefs are mediated by their beliefs about students. The results revealed that student factors affected the six teacher participants' actual instructional practices. In other words, the teachers' choices to accommodate students' motivational needs took precedence over their beliefs about effective reading instruction.

In Taiwan, research on English teachers' thoughts and beliefs or on the relationship between thinking and action is just in its inceptive stage (Wu, 1999). Wu (1999) identified four major themes constituting the eight technological English teachers' beliefs and knowledge about reading instruction, namely, teaching learners with particular needs, bridging and extension, striving for recognition, and pedagogical Inter-Actionism. Wu (1999) suggested that due to the particularity of technological institute students' cognitive and affective needs, teachers might try to: (a) understand students' reading proficiency, learning styles and their affective characteristics, and give them encouragement frequently, (b) focus on students' interests and confidence as a major concern in implementing teaching practices, (c) integrate reading with other language skills to increase students' motivation and learning effectiveness, and (d) release responsibility to students gradually by designing appropriate tasks. With regard the important relationships between teachers' beliefs and classroom practices, Chang and Huang (2001) also found out a significant relationship between them. They further concluded that the teacher role as a change agent should receive more attention in English education reforms because teachers are the sole decision-makers of any innovative devices in the language classroom.

Expert and Novice Teacher Decision-Making

Researchers have fruitfully used the construct of expertise to explore the knowledge that superior teachers possess (e.g. Berliner, 1986; Borko & Livingston, 1989; Carter, Cushing, Sabers, Stein, & Berliner, 1988). Differences between expert and novice teachers have been researched from the perspective of teacher cognition. Specifically, researchers have attempted to outline how features of the classroom may be mentally represented by both expert and novice teachers (e.g. Hogan, Rabinowitz & Craven, 2003). Comparisons of expert and

novice teachers have shown that they differ in how they perceive and interpret classroom events (Calderhead, 1981), think and make decisions (Berliner, 1987; Clark & Peterson, 1986), and develop expertise in pedagogical and content knowledge (Berliner, 1986). According to the research, expert teachers have information-rich schemas allowing them to represent the complexities of the classroom in meaningful ways (Calderhead, 1983), and possess metacognitive and monitoring skills enabling them to monitor the classroom situation, recognize problems, and make decisions to solve problems during teaching (Gagné, 1985). Expert teachers also attend to a larger number of instructional goals in making interactive decisions and use a larger range of instructional strategies and link actions to student cues in more complex ways than novice teachers (Fogarty, Wang & Creek, 1983).

Novice teachers, on the contrary, fail to adapt instruction in response to student cues due to their less well-elaborated schemas (Gagné, 1985). According to Westerman's (1991) study, novice teachers lack integrated knowledge about the overall curriculum and sufficient awareness of student characteristics, ignore students' prior knowledge and behavior cues, and therefore cannot make the three stages of decision-making—preactive, interative, and postactive—dynamically interrelated, like the expert teachers. In other words, novice teachers usually teach each lesson as a discrete entity without tailoring it to the characteristics of students because they cannot use various sources of information to form internal goals.

In the context of English teaching, researchers have also been investigating the nature of the professional decisions made by teachers in planning and implementing their language programs. The findings of their studies suggest that the key factor leading to the teaching effectiveness of expert teachers may be the fact that expert teachers frequently utilize pattern matches to adjust their teaching during interactive instruction (McMahon, 1995). According to Smith's (1996) study, the experienced teachers' decisions reveal an eclectic use of theory and a skilful blend of theoretical ideas with practical needs in the ESL instructional context. Milner (2001) has outlined the planning, thinking, and teaching of experienced English teachers and indicates that experienced teachers make responsive planning after learning about students' interests and the practical nature of the environment and adapt lessons interactively. Conversely, Johnson (1992a) claims that novice teachers have not developed a schema for interpreting and coping with what goes on during instruction, nor do they possess a repertoire of instructional routines upon which they can rely.

METHODOLOGY

Based on the purpose and rationale of the research, this study employed ethnographic methods to study the culture of the freshmen English classroom setting in the two technological universities.

Participants

This study, which was part of a larger study sponsored by National Science Council (NSC) on the comparison of eight expert and novice teachers' decision-making, examined four expert EFL teachers' thinking qualitatively. Purposeful sampling strategy (Morse, 1994) was utilized to study the underlying framework which guided the teacher participants' classroom actions. Several points with regard to the selection of the participant needed to be noted.

First, the researcher lent support to Patton's (1990) view that the logic and power of purposeful sampling lay in selecting information-rich cases, those from which one can learn a great deal about

issues of central importance to the purpose of the research. Based on this criterion, the researcher selected four case expert reading teachers because they had the knowledge and experience the researcher required (For the purpose of this study, the researcher believes that the four participants who have spent a considerable time teaching English reading in technological institutes will best match this category), the ability to reflect, and was articulate (Morse, 1994, p.228). Second, experience was not the only contributing factor in identifying expert teachers. Although experience may improve perceptual abilities, other criteria were included in the accurate identification of expertise. In the current study, the researcher also looked at the department chair's recommendation and the students' improved achievement. Finally, although the teacher participants had provided insightful understanding of the nature of experienced technological university English teachers' interactive decision-making, the results may not be generalizable to other populations and settings.

The participants in this study consisted of four expert teachers who were experienced professionals with a background in teaching EFL ranging from 5 to 13 years, and were recommended and judged as expert reading instructors by their department chair, their colleagues, and the students. They were professionally qualified, three with doctoral degrees in language instruction and one with master's degree in TESOL, and committed themselves to the improvement of English teaching in technological institutes. The study was conducted when the teacher participants were teaching Freshmen English, in which reading instruction constituted the major part of the required course.

Procedures

For the purpose of understanding, interpretation, and explanation, the researcher attempted "to investigate a multiplicity of features which would reflect the particular classroom contexts in which the teachers worked" (Burns, 1996, p. 156). The researcher thus adopted two major complementary methods, participant observations and ethnographic interviews, to study the social and cultural context of interaction in which the teacher participants' thinking and decision-making took place. An initial survey was completed prior to observations and interviews in order to obtain descriptive data about the teacher participants' past teaching experiences, teaching philosophies, and about their knowledge of technological university students.

A semi-structured pre-observation interview focusing on probing the teachers' thinking in instructional planning was conducted prior to classroom observations (see Appendix I for the interview questions). Each interview lasted for fifty to sixty minutes. It should be noted that all the pre- and post-observation interviews were conducted in Chinese because the researcher thought the teacher participants could verbalize and interpret their perceptions and reasoning for actions more explicitly in their native language. The questions were constructed to capture a holistic picture of the teacher's thinking and perceptions related to pedagogical decisions in reading instruction. The teacher participants were requested to talk freely about their conceptions and understanding of the characteristics and particularity of reading instruction in the technological university, their interpretations of their roles and classroom interactions, the content of their decisions, and their self-monitoring or evaluation of decision-making processes.

After the pre-observation interviews, participant observation, the primary technique employed by ethnographers to gain access to data (Janesick, 1994; Patton, 1990), was employed to

actually experience the classroom phenomenon. Each of the four teacher participants was observed teaching at least five consecutive two-hour classes in the second semester of the academic year in 2004. The reason for selecting the second semester was that the teacher participants should have had better knowledge of the students and the features of the classroom, and that should have enabled them to provide information-rich data. Field notes were taken during the observations (see Appendix III for a sample of the field notes), and these contained the observer's (also the researcher's) own feelings, reactions to the experience, and reactions about the personal meaning and significance to the observer of what had occurred. Field notes were expanded immediately after each class session to ensure as complete and accurate a record as possible of the teacher participants' actions in the classroom. Analytic memos including the researcher's thoughts and questions generated from observation were also written to help develop questions for the post-observation interview and to provide explanations for the findings. Preliminary analysis of the lesson structure was carried out after each class session to identify emerging patterns of classroom interaction and events that might elicit instructional reflections from the teachers.

A post-observation interview using the stimulated recall procedure was conducted to each of the teacher participants to obtain their reflections about the instructional sequence and reasoning in implementing specific interactive decisions (see Appendix II for a sample of post-observation interview questions for Teacher III). Each post-observation interview lasted for thirty minutes to fifty minutes unequally, depending on the time spent verbalizing the reflections on what was occurring in individual classroom. All interviews were tape-recorded and later transcribed. The transcripts in conjunction with field notes served as the primary data source for exploring the teacher participants' planning and post-lesson reflections.

All data collected through the initial survey, classroom observations, ethnographic interviews supplemented by pertinent documents (teaching syllabus, classroom materials used during the lessons, and teacher-designed evaluation forms) were taken as a whole and put into on-going content analysis utilizing "the constant comparative method" (Glaser & Strauss, 1967). Specifically, the researcher followed the procedures of analyzing qualitative data, which involved identifying, coding, categorizing, and theorizing about the recurrent patterns or themes in the data (Patton, 1990). Then, the categories of the emerging patterns and recurrent themes in the data served as the source for constructing the theoretical framework representing the teacher participants' thinking and interactive thoughts, and helped describe and interpret their teaching practices.

FINDINGS

Based on the on-going content analysis of observations and interview data, four themes were identified to describe and explain the teacher participants' cognitive processes in reading instruction. They were: (a) network of teachers' BAK (beliefs, assumptions, and knowledge), (b) mental representation and information-processing, (c) schemata about students, and (d) knowledge-in-action.

Network of Teachers' BAK

All of the teacher participants indicated that their instructional decisions and teaching practices were shaped by their internalized beliefs, assumptions, and knowledge. Their underlying beliefs about the language, learning, and teaching evolved from their professional practices over time

and eventually contributed to their teaching styles. Specifically, three sub-themes, "the teacher's experiential world", "cognitive interpretation of language teaching and learning" and "perception of self as language teacher" was identified to elaborate the teacher participants' deeply held beliefs, and how these belief systems guided and shaped their teaching practices (see Figure 1).

The teacher's experiential world. Implicit in the teacher participants' knowledge and actions were their personal and social experiences. The teacher participants went into the classroom with their personal beliefs about the classroom and students and images of themselves as language teachers. For the most part, these preconceptions and images were associated with their recollections being a student in a classroom, and their teaching experiences in the classroom. In depth interviews with the teacher participants and observations of their subsequent actions and reflections revealed that the teacher participants' experiences as a learner and as a teacher influenced their images of themselves and their students as learners. For example, the teacher participants indicated that their personal learning experience had had tremendous and long-lasting effects on their teaching styles. Their successful learning experiences provided strong roots for their beliefs about students and their role in the learning process. Also, their recollections being a teacher, and their early teaching experiences served as a reminder in structuring the lesson and assessing the students' performance.

Cognitive interpretation of language teaching and learning. Many statements related to the teacher participants' cognitive interpretation of language learning were repeated throughout the interviews. Table 1 shows the teacher participants' perceptions of the ideal EFL learning environment and instructional objectives for teaching reading in technological institutes. The data collected indicates that the teachers' beliefs about learning influence the way they approach their lesson. Their classroom practices are closely linked to their beliefs about teaching, including the materials they select, the teaching strategies they try to implement in their classroom, and the teaching objectives they set the course. For example, both Teacher II and Teacher III indicated that promoting students' communicative ability should be placed as the major objective of English instruction in technological institutes. Therefore, their classes were full of productive discussions and activities aimed to foster students'

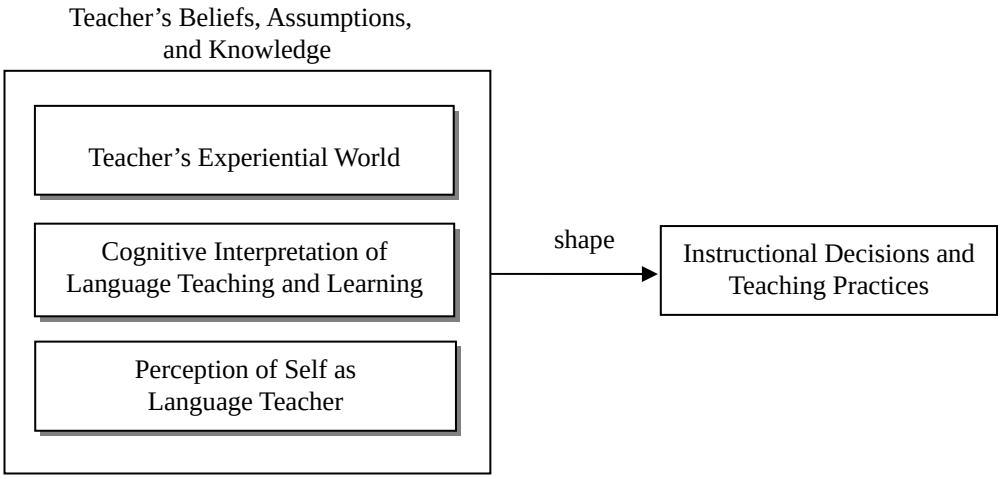

Figure 1. The Network of Teacher's Beliefs, Assumptions, and Knowledge

ability to express themselves. In brief, although there were differences in how each of the four teacher participants approached the instructional tasks, their individual practices were related to their cognitive interpretations of language learning and teaching. All of them recognized the important roles that motivation, fun, interest, and class dynamics play in English learning. And therefore, they shared the view that building a positive and supportive learning environment is essential to promoting students' motivation, involvement, and active learning, especially for those students from technological and vocational education system (TVES). They emphasized the need to foster this positive and supportive learning climate by employing student-centered activities, using appropriate materials, and creating an anxiety-free environment. This belief in the importance of classroom climate influenced the teachers' decision-making in performing classroom tasks and choosing materials.

Table 1: Teacher Participants' Perceptions of the Ideal EFL Learning Environment and Instructional Objectives for Teaching Reading

Characteristics of the Ideal EFL Learning Environment	Objectives for Reading Instruction
1.Students in a pressure-free, anxiety-free environment	1.Promote students' communicative ability
2.Students being provided with a significant and authentic learning situation	2.Help students use the language as a tool to acquire knowledge
3.Students learn under positive social interactions in the classroom	3.Enhance students' pragmatic ability in the use of English
4.Students being provided with interesting and varied materials	4.Improve students' ability in expressing themselves
5.Students with high motivation, intention, and expectations for success	5.Enhance student's empathy for different cultures
6.Students take active roles in learning and becoming independent readers	6.Help students develop the four language skills
7.Enthusiastic students' active participation in tasks and activities	7.Enhance students' reading comprehension
8.Students learning in supposedly virtual authentic context provided with multi-media facilities	8.Help students acquire reading skills and strategies-skimming, scanning, predicting, inferring, and summarizing
	9.Sustain students' interest in English learning
	10.Promote self-directed learning

Perception of self as language teacher. Teacher participants' subconscious and internalized beliefs are also manifested in the way they see their roles as language teachers, and consequently influence the way they structure the reading classes. They see themselves as motivators, facilitators, friends, problem solvers, needs analysts, diagnosticians, guides, empowerer, cultivators, and doorkeepers. For example, Teacher II emphasized that he is "not only a spoon-feeder of knowledge, but a facilitator, a doorkeeper always trying to monitor, remind, and give students help." Likewise, Teacher III assumed that she was a facilitator taking on the "duty to motivate students and sustain their interest." Teacher IV's interpretation of her role as a cultivator is very intriguing. Her perception of self as a

teacher indicates her internalized beliefs about teaching, which contributed to her teaching style. Based on the field notes of classroom observation in this study, her reading classes were very productive and students were enthusiastically sharing their ideas and opinions about the topic. Students were allowed to personalize the reading topic and given lots of opportunities to bring their own experiences into the classroom. The following transcription reflected her learner-centered approach to the lesson and her interpretation of herself as a language teacher.

> {Quote} I never respect the relationship in which teachers just assume their roles as lecturers and students as lecturees. I mean I don't like this kind of teaching style… I wouldn't employ this way of teaching. As I was just saying, I prefer interactive teaching, in which I 'work with' students to learn and discover some knowledge rather than 'teach' them. So, in my opinion, teachers are like cultivators trying to nurture students with effective learning methods and waiting for blooming. You never know when the flower (of students' achievement) will blossom… Besides, learning is interesting and enjoyable thing. Teachers should play the role as a guide trying to find the best way to help students acquire knowledge. [Teacher IV]

Mental Representation and Information- processing

Many statements related to the teacher participants' well-developed metal representation (defined as the mental construction, preservation, and interpretation of information of the real world object and events, according to McNamara (1994)) and skillful information-processing ability surfaced throughout the field notes and interview data. The expert teachers' well-elaborated schemata (defined as knowledge structure that summarizes information about teaching, teaching activities, classroom events and components of teaching, based on Borko and Shavelson (1990)) and previous successful teaching experiences helped them interpret the classroom events in a much more considerate way, and therefore led to effective teaching.

Well-developed metal representation. Based on their stored information about their students, including student ability, knowledge, motivation, and behavior patterns, these expert teachers formed a well-developed mental representation of classroom structure which, in turn, served as a guide and allowed them to adapt their planning to students' needs as the lesson progressed. In other words, they have developed expertise in how pedagogical and content knowledge interact in teaching. In addition, interpretations of students' responses served as the essential prerequisite for the construction of their mental representation.

Skillful information-processing capacity. The teacher participants in this study demonstrated their skillful information-processing abilities. They not only had learned what aspects of classroom life were salient to teaching and learning, but also attended to a larger scope of student cues when making interactive decisions. For example, all of the teacher participants emphasized that their perceptions of students' learning styles, activity preferences, individual problems, immediate needs, and affective states all influenced their interactive decisions. For this, Teacher III emphasized that her "interruption, questioning, and explanations were prompted by intuitive perception of the students' needs."

Schemata about Students

Better developed knowledge structures and effective classroom strategies, along with on-going assessments and reflections constituted the four expert teachers' schemata, which in turn increased

their skills in processing information in the unpredictable classroom world and led to their expertise in reading instruction.

Practical knowledge about students. Through years of teaching and learning, the teacher participants have built a body of practical knowledge which is oriented to the situation and determines their actions in practice. Among this vast knowledge domain, the teacher participants' views of technological students are the most developed parts, and appear to impact their decision-making and classroom practices. Rich data indicated that the teacher participants had comprehensive knowledge about students which helped make sense of the teaching environment in technological institutes. Based on their observations, students in the technological institutes "are less-motivated, reticent and reserved, incompetent in using different reading strategies, hesitant to express themselves, and stick to bad and passive reading habits." Their understanding of student characteristics in terms of their prior knowledge, learning attitude, proficiency level, and the use of reading strategies helped formulate their plans and decisions and adjustment of teaching practices.

Effective classroom strategies. The above-mentioned knowledge of students subsequently was used when the teacher participants selected instructional interventions for their students. The teacher participants also used a variety of classroom strategies in managing instructional tasks and situations, and responding to student needs. For example, whereas Teacher II tried to "employ webbing, brainstorming, or Q&A as warm-up activities to encourage the students to express themselves", Teacher III endeavored "to plan and design appropriate lessons and provide students with opportunities to perform extensive reading." Furthermore, the teacher participants were observed to frequently: (a) give the students a summary of the classroom activities, (b) use performance-oriented learning activities to foster more classroom interactions and encourage students' involvement, (c) approach lessons by group discussions in which the teacher provided multiple channels for learning to read, (d) exploit students' various cognitive skills and talents (e) allow fluidity in the styles of students' presentations, and (f) employ various strategies and student-centered activities to promote involvement and strengthen memory.

Knowledge-in-Action

The theme "knowledge-in-action" was identified to elaborate the contextual factors that influenced the teacher participants' interactive decision-making and shaped and guided their teaching practices in the classroom context. It provided the reasoning for the deliberate, and moment-to-moment on-line decisions and deviations from pre-planned activities. In other words, on-going monitoring of classroom dynamics helped the teacher participants tailor their instructional activities to better meet students' needs.

On-going assessments. In this study, post-lesson interviews using stimulated recall procedure were conducted to gain the insider's reasoning for and interpretations of the classroom decisions. The data indicated that the teacher participants' interactive decisions were affected by their awareness of the perceived teaching effectiveness on a specific group of student at a specific point of time. They continually judged their particular teaching practices and sometimes altered them to fit the specific classroom context. They were prepared to adapt and alter their plans based on their observations of students' changing needs and performances. For example, the following remarks revealed what Teacher II

constantly paid attention to in the reading classroom.

{Quote} Students' emotions often serve as an index for my implementation of decisions… If students shrink or are afraid of interacting, I will think about my own teaching, strategies, techniques, behaviors or even emotion… I will modify appropriately…Besides on-going monitoring, I also analyze students' quiz results and needs survey…If they didn't do well, I know I should switch from a top-down approach to a more bottom-up one. [Teacher II]

Field notes of the teaching episodes also manifested that the teacher participants often deviated from their predetermined plan to: (a) provide more relevant background knowledge because they detected students' problems in doing tasks, (b) structure tasks so that integration of four language skills were enhanced, (c) employ multiple intelligences and different cognitive skills to encourage less-proficient students, and (d) maintain an atmosphere that enhanced learning and promote student achievement. For this, Teacher III explained that her "class is flexible, and ready to be altered according to students' emotion, proficiency level, attitude, and the real situation." Her reasoning for flexible class was as follows: "Basically speaking, I'm always monitoring the class, paying attention to individual student and adjusting my teaching behavior accordingly. For me, teaching is a continuous test or experiment." In short, the success of activities and students' responses were what the teacher participants constantly paid attention to in the reading classroom. Students' behavior was regarded as an important index for adjusting their teaching behaviors. On-going monitoring of classroom dynamics helped the teacher participants tailor their instructional activities to better meet students' needs.

Reflections-in-action. Reflection-in-action, the heart of the expert teachers' interactive thinking, gave life to their teaching and was clearly demonstrated in their smooth structure of the class. The strategies or the tricks (in Teacher II's words) that the expert teachers had developed during years of teaching were accessible to them at the time they were approaching the lessons. Based on those available strategies and the situated constraints or tensions, the expert teachers were ready to make adjustments of the situation. In other words, the expert teachers made changes according to students' reactions and environmental constraints.

In fact, the expert teachers' flexibility in approaching lessons could be easily found in the field notes. They were observed to modify the lessons because they felt that the lesson was not proceeding satisfactorily or that they wanted to respond to an identified problem. Sometimes, they even decided to drop the task which had originally been planned as a major focus of the lesson because some other activity could generate a great deal of interest and a high degree of participation. The following verbalization from Teacher III demonstrated one of these reflections-in-action in the teacher participants' interactive and post-active thinking.

{Quote} I felt that the student who was presenting was educating us by giving a lot of knowledge of a particular subject. He was so well prepared that I decided not to care about the time limit. I did think everyone, including me, could gain some information from his report. … But, the content of his presentation interested other students. He was so persuasive, authoritative, and confident. So, I decided to let him exploit what he was most confident about. I wouldn't care about the time constraints so long as the presentation could generate students' interest and of course they could learn something. [Teacher III]

DISCUSSION

The results of this study are discussed in accordance with the following issues: (a) the role of teacher's beliefs, assumptions, and knowledge, (b) expert teacher's mental representation and information-processing capacity, (c) expert teacher's schemata about students, and (d) teacher's knowledge-in-action.

The Role of Teacher's Beliefs, Assumptions, and Knowledge

The network of teachers' internalized beliefs, assumptions, and knowledge about language teaching and learning emerged as an important factor in shaping the teacher participants' instructional decisions. Their underlying beliefs, assumptions, and knowledge about the English language, English learning and teaching evolved from their professional practices over time and eventually contributed to their teaching styles. The belief systems then played important roles in how the teacher participants interpreted events related to teaching and affected their classroom decisions. This finding lends support to the views of researchers who argue that the investigation of teachers' belief systems is a necessary and valuable avenue of educational inquiry because there is a strong relationship between teachers' educational beliefs and their planning, instructional decisions, and classroom practices (e.g., Agne, Greenwood, & Miller, 1994; Borg, 1999; Clark & Peterson, 1986; Pajares, 1992; Richards & Lockhart, 1994).

Expert Teacher's Mental Representation and Information-processing Capacity

The teacher participants' well-developed metal representation and skillful information-processing ability enables them to achieve effective teaching. Shulman (1987) conceptualized a teacher's mental representation of a lesson as a bridge linking the teacher's understanding of the lesson content to the learning of the students. Experienced teachers have developed context-specific information and learned to recognize what must be considered in any given classroom context (Johnson, 1999). They know when and how to make deliberate decisions to implement specific actions when confronting the diversity, complexity, and immediacy of classroom events. The finding suggests that teachers reach teaching effectiveness by developing their "information processing capacity" because limitations of the capacity will impede the teachers' perceptions of the classroom situation (Kleven, 1991). That is, effective language teaching can be reached as long as teachers are equipped with the ability to analyze and interpret the teaching situation and to plan, develop a policy, and come to decisions in the interests of their students and programming (Stern, 1992). The finding also lends support to Westerman's (1991) contention that the skill in processing information is of utmost importance in the complex and unpredictable world of the classroom.

Expert Teacher's Schemata about Students

The finding of the study indicated that several student characteristics, including their abilities, learning styles, classroom behaviors, work habits, and affect states, were taken into account when the teacher participants were making the pedagogical decisions. Knowing more about the students served as a resource and played a crucial role in the planning of reading instruction among the teacher participants. The in-depth analysis performed in this study provides striking evidence that the expert teachers' teaching displayed a comprehensive, complex, interconnected, and easily accessible schemata which provided a framework for the meaningful

interpretation of information and classroom events, and permitted them to make flexible adaptations accordingly. It is the well-elaborated schemata the expert teachers possessed that accounted for the teaching effectiveness in the reading classroom. This finding supports the views of Borko and Livingston (1989) who characterize successful improvisational teaching as having an extensive network of interconnected and easily accessible schemata, and having the ability to select particular strategies, routines, and information from these schemata during actual teaching.

Teacher's Knowledge-in-Action

The teacher participants' "knowledge-in-action" helps explain the reasoning for their teaching practices and deviation from their lesson plans. First, better knowledge about the characteristics of students and specific constraints and conflicts faced in reading instruction in technological institutes facilitates the expert teachers' skills in processing information in the unpredictable classroom world and leads to their refinement of interactive decision-making in reading classroom. Then, on-going assessment and reflection triggers deviation to better fit the classroom context. Woods (1996) proposes that resources and constraints are inversely related and both are necessary for planning and decision-making, and a lack of resources acts as a constraint and limits the possibilities of options open to a teacher. Therefore, teachers should spend much more time not only looking for resources, but also studying and considering the constraints when they are making decisions in reading instruction. As Stern and Shavelson (1983) imply, effective teaching involves a process in which teachers make reasonable judgments and decisions about the methodology to use in a particular situation and perform these decisions in the classroom context. Teachers should be more aware of the immediacy and apparent intuitiveness of the decision-making process (Hargreaves, 1994). Then, they can become experienced teachers who work "with high sensitivity to unpredictabilities and particularities of context, to the importance of interpersonal relationships, and to the successful completion of the tasks-in-hand" (Hargreaves, 1994, p. 104).

It should be noted that the components of the theoretical framework discussed above interact in a continuous and dynamic way. In other words, supported by their network of beliefs, assumptions, and knowledge, the expert teachers' well-elaborated schemata, which involve knowledge of students, classroom strategies, and on-going assessments and reflections, lead to effective teaching. And then, the effective teaching experiences accumulated contribute to the reconstruction of the expert teachers' knowledge system, or schema. This finding lends support to Westerman's (1991) conclusion that it is the interaction among the information-rich components in teaching that accounts for expertise.

CONCLUSION, LIMITATION AND PEDAGOGICAL IMPLICATIONS

The findings of this study underscore the important role played by teachers' cognitive components. It is shown that better developed knowledge structures and effective classroom strategies, along with on-going assessments and reflections, constituted the expert teachers' schemata, which in turn increased their skills in processing information in the unpredictable classroom world and led to their expertise in reading instruction.

There are still some limitations to the applicability of the findings. First, the number of teacher participants in this study provided just a small

scale of investigation; thus, it probably needs further research for a more solid conclusion. Additionally, without the use of videotaped excerpts of the teaching situation, access to the teachers' reports on interactive thoughts was confined to the field notes and interview data. Therefore, possible future research reporting on the expert teacher's perceptions and reflections on teaching episodes may help close the gap between the current study and the literature. Finally, a narrow, or more focused scope of research should follow to discover and describe how specific instructional activities are deemed to influence teaching effectiveness and lead to teacher's expertise in reading instruction. The explicit description of the expert teacher's skills and efficiency in probing for student comprehension and learning outcome should provide a more rapid track for fostering the development of pedagogical expertise in reading instruction.

Based on the findings of the study, some pedagogical implications are proposed as follows. First, deepening our understanding of teachers' mental construction and interpretation of information of the real classroom world is fundamental to improve current practices of both pre-service and in-service teachers (McNamara, 1994). As Hogan, Rabinowitz, and Craven (2003) suggested, specific activities to improve one's perceptual and representational skills of classroom events should be proposed because these skills, in turn, may offer an improved ability to perceive and respond to classroom situations more expertly. Secondly, reflection is a key element in helping the teachers to develop their knowledge. Teaching has been repeatedly emphasized by researchers as a complex and cognitively demanding human process in the field of ESL/EFL (e.g. Clark & Peterson, 1986; Richards & Lockhart, 1994). It is "a complex, messy business of knowing what to do in the classroom" (Freeman, 1996b, p. 109). Therefore, in this ever-demanding profession, individual teachers should learn to look objectively at their teaching behaviors and be reflective critically and professionally. Thirdly, in addition to pedagogical content knowledge, the researcher suggests that teachers increase their practical knowledge (or classroom knowledge) to make informed and skilled decisions. In addition to on-going classroom observations, multiple methods of needs assessment should be employed to gain students' honest feedback, so that the teachers can accommodate student needs and tailor activities to the specific classroom context, especially when they are facing a group of less-proficient, less confident, and poorly-motivated students in the TVES (Hung, Joe, & Wu, 1998).

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APPENDIX I: Pre-observation nterviewing Questions (translated)

1. What do you think are the major purposes of reading instruction at technological institutes?
2. What are the instructional objectives you set for the technological students? What ideas do you emphasize for your students when you teach reading?
3. What do you believe constitutes an ideal EFL classroom?
4. What factors do you think are critical to good reading instruction?
5. How do you think one can to be a successful English reading teacher?
6. Please describe your typical reading class.
7. Would you describe your major considerations in selecting your reading materials?
8. What is your view toward your students? According to your observation, what characteristics do students in technological institutes have in learning EFL reading? How do you take account of those characteristics in your teaching?
9. What kind of strategies or activities do you usually employ in your reading classroom? Which of them did you find better motivate students to read or promote reading effectiveness?
10. How do you interpret your “teacher’s role” in the interactive instructional setting?
11. Please describe your interactions with students in reading classes. How can teacher-student interactions influence your teaching of reading?
12. What are the major factors, be they positive or negative, which influence your teaching of reading?
13. In your reading classes, what do you usually do to promote students’ understanding, motivation, and involvement?
14. What do you think about the learning climate or classroom atmosphere on teaching reading?
15. What method do you use to evaluate your teaching? What do you do when you find some problems of the students in your evaluation stage?
16. In the classroom context, what information will serve as cues for refining your lesson plans?
17. Could you tell me about incidents, occasions, or situations that you feel rewarding in teaching reading? How do they influence your thoughts about EFL reading instruction?

APPENDIX II: Sample Post-observation Interview Questions (for Teacher III)

1. I noticed that you often intervened in students’ presentations. Could you explain why?
2. I noticed that you frequently encouraged students and were concerned about their feelings, especially for students with low proficiency. (For example, when X was going to present, you reminded other students to approve his talents in other areas.) Can you describe your view on students’ affective factors in learning English? What do you usually do to encourage students with lower proficiency?
3. During the group presentation, the topic of one of the group was “My English Teacher”. They prepared a lot of questions and were going to take turns to interview you in the class. At first, you were surprised and disapproved of this way of presentation. But eventually, you agreed to be interviewed. Could you tell me what affected you to make the decision?
4. When being asked about your suggestions for learning English, you asked one of the students with good proficiency in English to give his

suggestions too. And you always switched the chance to other students after you had answered the questions. Can you describe what led you to the decision to do so?

5. During the interview, you also talked about your personal experience in studying English in America showing the students how you made improvement in English proficiency. What was your purpose in doing this?
6. During the group presentation, one group was reporting about the author of *Harry Potter*, Joan Katherine Rowling. After the presentation, you added information about the popularity of *Harry Potter* in America by sharing what you had witnessed in America. Can you tell me why you made this decision?
7. During the students' group presentation about Genghis Khan (成吉思汗), the last reporter conducted his way of presentation differently. He seemed to have the power of leadership, and the students' attention was drawn to him. He always referred to the map he drew on the board showing the great success of Genghis Khan. I noticed that most students were interested and the time for Q & A lasted for more than 20 minutes. Could you tell me why you allowed this flexibility at this moment?

APPENDIX III: A Sample of Field Notes of Classroom Observation

Date: Monday, May 17, 2004
Teacher Participant: T-III
Time of Class: 8:10—10:00 AM
Location: C3506
Name of Class: Freshmen English

Today is scheduled for students' group reports. After the teacher participant greeted the students, students of group one were engaged in preparing for the presentation—drawing pictures on the board and getting ready to take turns reporting life about John Nach. Some key words about this Nobel Prize winner were written down on the board too.

At first, I assumed that the teacher participant might just sit among the student- audiences evaluating students' performances. As a result, I might not find out some critical events reflecting the teacher participant's interactive decisions, which was the focus of my research. However, as the class hour moved on, I found teacher participant IV approach the lesson very flexibly and make interactive decisions frequently during students' group presentations.

Classroom Activities	**Researcher's Comments**
－The teacher sat among the students' seats watching student-presenters preparing for the reports on the mathematician, John Nach.	＊I noticed that the atmosphere seemed to be relaxing despite the fact that students were supposed to present today. They didn't seem to be tense at all.
－Each group member took turn reporting about the life and achievements of this great Nobel Prize winner.	＊It seemed to me that this group of students were taking turns "reading paragraphs" instead of reporting.

－The teacher interrupted by asking the presenters whether they understood those paragraphs they were reading. She reminded students that they should digest the information first before they did the presentation.	＊Why did the teacher decide to mediate the presentation? To clarify information?
－The teacher kept intervening to ask presenters questions and restated some key points to the class.	＊What led the teacher to intervene? To teach to the moment by adding more information?
－The fourth presenter, with anxious and timid facial expression, came to the front, drawing beautiful pictures on the board. Before he presented, the teacher reminded the other students to give recognition to his talent in fine arts although he had difficulty pronouncing English words correctly.	＊It seemed to me that the teacher was concerned with student's affective state. She tried very hard to lower his anxiety.
－One presenter added the information by using Chinese.	＊The teacher didn't seem to mind students' use of native language in the presentation. Why?
－The second group (7 students in total) were ready to report. The topic "My English Teacher" was written down on the board. However, they were going to take turn interviewing the teacher. The teacher was surprised and hesitated for a second. But then, she participated and tried to be cooperative answering each question.	＊At first, the teacher disapproved of this way of presentation. Why did she eventually decide to be interviewed? What led her to make the interactive decision?

國立虎尾科技大學學報　第二十五卷第三期 （民國 95 年九月）：105-126

專家教師認知過程之俗民誌研究

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摘　要

本文旨在描述與詮釋四位科技大學英語閱讀教學專家教師的思考與互動思考模式，並探討其心理表徵、訊息處理與對教學事件的理解。本研究採「教育俗民誌」的研究方法，針對教室觀察實地筆記、俗民誌訪談轉錄資料、以及參與教師的教學相關文件資料進行質性資料分析。研究結果顯示，經驗豐富的專家教師擁有建構良好的知識結構，能有效的採用各種教學策略，並能持續的檢視、評估與反思。而這種複雜的基模增加了教室情境訊息的處理能力，也因而成就了閱讀教學的專業知能。四個要素可以說明專家教師教學的認知過程：（一）教師的信念、假設與知識構成系統，（二）心理的表徵與訊息的處理，（三）對學生的基模，以及（四）行動的知識。

關鍵字：專家教師、教師思考、心理的表徵、教師決定