A QUALITATIVE STUDY OF DECISION MAKING PROCESS BETWEEN EXPERT AND NOVICE TEACHERS IN TEACHING STUDENTS WITH INTELLECTUAL DISABILITY

Su-Hua Ho; Kae Liu*

Department of Special Education
Chung Yuan Christian University
No.200 Chung-Pei Rd.
Chung-Li 32023, Taiwan, R.O.C.

*National Taoyuan Special School for Adolescents with Intellectual Disability
No.10 De-Shou St.
Taoyuan 32062, Taiwan, R.O.C.

Abstract

This qualitative research was designed to study the decision making process of expert and novice teachers during three stages of teaching: preactive or planning, interactive or actual teaching, and postactive evaluation or reflection. Four teachers in teaching students with intellectual disability were selected based on the teaching experience, the setting and the severity of the students' disabilities. The two novices were the first year teacher and the two experts had more than ten years' experiences.

Data was collected from multiple sources including semi-structured interviews, participant observations, videotaping, stimulated recall procedure, and inspection of documents. Qualitative analysis methodologies provided rich in-depth descriptions of each teacher's belief and decision making process.

Differences found between decision making of expert and novice teachers most notably involved in two areas: the integration of the information and the estimation of students' needs in the preactive stage. During the interactive stage, the decisions that both expert and novice teachers made could be classified into two major categories: instructional and managerial. The expert teachers did better than the novices did in making interactive reflections and immediate decisions to adjust students' needs. The major difference between the novices and experts related to the focus and the depth of their reflection in the postactive stage. This study also found that the expert teachers' decision-making were consistent with their teaching beliefs, however, this was not always true for the novice teachers.

Both the expert and novice teachers reported that the stimulated recall interview, watching and discussing their videotaped lessons were very helpful. Recommendations were presented for preservice education programs.

Introduction

Teaching is tremendously complex and demanding process. Teaching students with intellectual disability faces to even more complex situation, because the individual difference of students is more obvious. Teachers need to diagnosis students learning difficulties and tailor their teaching plan to adjust students' special needs. They make decisions constantly.

Decision making is a basic and essential teaching skill (Shavelson, 1973, in Westerman, 1991). A teacher's thinking and decision making organize and guide his /her teaching plan and actual teaching behavior (Westerman, 1991). Decision making involves in all three stages of teaching process: preactive or planning, interactive or actual teaching, and postactive evaluation or reflection. Teacher thoughts and decision making have become important research topics in teacher education or teacher effectiveness. Studying the decision making process of expert and novice teachers can help us to understand the difference between experts and novices and to enhance the professional development of novices. Further then, it increases students' learning effects.

Researches on teacher effectiveness have focused on teachers' observable behaviors. Prior to 1975, the dominant research paradigm was the process-product approach to study the relationship between teachers' classroom behaviors, students' classroom behaviors and students' achievements (Westerman, 1991). The research on teachers' thought process such as teaching decision making has emerged recently (Clark & Peterson, 1986). Clark and Peterson (1986) developed a model to explain the cyclical process of teaching and made a thorough review of literature on teachers' thought process. Their review summarized the current knowledge about teacher planning, teachers' interactive thoughts and decisions, and teachers' theories and beliefs.

Researchers interested in teacher cognition explored the differences between expert and novice teachers. Comparisons of expert and novice teachers have shown that they differ in their thinking and their decision making (Forgarty, Wang, & Creek, 1983; Gagne', 1985; Westerman, 1991). The major characteristics that distinguish an expert from a novice are complexity of skills, amount of knowledge, knowledge structure, and problem representation (Bereiter & Scardamalia, 1986). The experts not only have a great proficiency of their skills but also have greater amount of knowledge and well-developed structure of their knowledge than the novices do. In

addition, they have broader scope of repertory of problem types and their possible solutions than novices have.

Some researches indicated that expert teachers had rich information schemata that allowed them to represent the complexities of classroom in meaningful way, and to monitor classroom situations, to recognize problems and to make decisions that solved the problems (Gage & Berliner, 1984; Gagne', 1985). Veenman (1984) explored beginning teachers' perception of problems in teaching and concluded that teachers at different developmental stages perceived and processed problems in different ways. Beginning teachers perceived that they had more difficulties with discipline and classroom management than with delivery of subject content. Shieh (1996) compared expert and student teachers' thinking related to teaching event. Their study indicated that the student teachers were concerned with basic teaching techniques, whereas expert teachers were concerned with rational of education and needs of students.

Researches indicated that expert teachers formed a much more comprehensive mental representation of their teaching than novices did (Berlinger, 1988, in Westerman, 1991). On the other hand, novice teachers formed too narrow or incorrect mental representation of their lessons and therefore leaded to problems during teaching.

Forgarty et al. (1983) found that novice teachers failed to adapt instructions in response to students' cues. They seemed to stick closely to their lesson plans, with less flexibility to tailor their lesson according students' needs (Westerman, 1991). On the other hand, the expert teachers attended to a large number of instructional goals, used a large range of strategies, and linked their actions to students' cues in ways that are more complex.

Westerman (1991) proposed an interaction model of expert teachers' decision making encompassing all three stages of teaching. He emphasized what made an expert teacher was more than simply having more elaborated schemata. It was the way that a teacher processed information. His model shed the light on what Berlinger (1988, in Westerman, 1991) and Forgarty et al's (1983) finding. According to his model, the expert teacher integrated a broader scope of information such as knowledge of curriculum, students, pedagogical, subject matter and beliefs, etc. In addition, they weighted each component of information quickly and interacted them in a dynamic way across the three stages of teaching. Therefore, the expert teachers

had a comprehensive view of teaching and could make better decisions to adjust students' needs. On the contrary, the novice teachers integrated much narrower scope of information and they processed the information in a linear way. As a result, it affected their perception of classroom events and their decision making.

Some researches investigated the influence that affected teachers' decision making. For example, Stinson (1998) investigated four first-year teachers to identify decision points in their teaching and to name the influences that affected those decisions. The results indicated that the decisions made by the first-year teachers were of two types: instructional and managerial. The primary influences that affected those first-year teachers included student needs, prior experience, normative influences (environmental factors such as administration, curriculum guides, department regulations, etc.) availability of materials, university/teacher education programs, and professional development.

Rogers (1995) investigated 31 special education resource teachers to identify the factors that influenced the resource teachers' instructional decision. The results indicated that both instructional variables and student status were identified as factors that influenced the resource teachers' decision making. Teachers were being influenced by student characteristics for the relatively less successful students.

Stough & Palmer (2001) compared the instructional decision making of 19 expert and novice special education teachers. The results indicated that experts reflected significantly more often on students' prior knowledge and typical behaviors. Experts also displayed significantly more comments about instructional strategies and collaboration than did novices.

Stouhg & Palmer (1996) examined the reflections of 13 special education expert teachers. The results indicated that the stimulated recall procedures successfully prompted teachers to express their thoughts and emotions concerning targeted teaching sequences. The expert teachers used instructional diagnosis and frequently consulted regular education teachers to teach students with special needs.

Penso & Shoham (2003) examined 21 student teachers' reasoning while making pedagogical decisions at two stages of the teaching process: the preactive stage of lesson planning and the postactive stage. The results were: (1) At both stages, the student teachers' pedagogical decisions focused on topics related to teaching methods and skills, and to lesson structure and organization. (2) Most of the arguments used to explain the teachers' decisions related to the learners and only a few to the teachers.

Researches on the cognitive process of teacher decision making have provided the theoretical basis for this line of study. Recent researches on teacher decision making have different focuses on the research topics. In special education area, only few studies investigated the decision making of novices and experts. None of them examined the differences in the three stages of teaching, nor did they explore the consistency of teacher belief and teaching decision making. The purpose of this study was as following:

1. To clarify our understanding of the nature of decision making process of expert and novice teachers in teaching students with intellectual disability.
2. To explore the influences that expert and novice teachers reported to affect their decision making.
3. To examine the consistency of the teacher beliefs and decision making of expert and novice teachers.

Method

Participants

Participants were four certified special education teachers: two expert teachers and two novices. The novice teachers were in their first year teaching career. The expert teachers were selected according to the following criterions: (1) had at least ten years of teaching experience; (2) were nominated by their supervisors as being effective teachers; (3) had obtained the reward of the super special education teacher; (4)were confirmed by the principles of their school. Two of them, one expert and one novice, were teachers in a special school for adolescents with intellectual disability. The others were teaching students with intellectual disability in self-contained special education classroom of a public elementary school. Three of the participants were female, while one was male.

Procedure

Data was collected from multiple sources including semi-structured interviews, participant observations, videotaping, stimulated recall procedure, and inspection of documents.

A semi-structured interview was conducted to discover each teacher’s belief. The interview questions which were designed in eliciting teachers’ value and beliefs were related to students, teacher roles, curriculum, instruction, and teaching environment. Each interview was audiotaped and transcribed. The “member checking” procedure was applied to validate the construction of teacher beliefs. The description of

participants' teaching beliefs were reviewed and confirmed by each participant.

In order to observe the various activities taking place in each classroom, observations were made in different subjects on different days. Observation generally lasted two hours each time. Notes were taken during observation.

After observation of each lesson, an interview was conducted to determine what decision making went into the preactive stage. The questions probed the teachers' thinking in planning the lesson were as the following:

"Where did you start when you planed this lesson?"

"What did you think about when you planned this lesson?"

"Was this lesson related to anything else?"

Then a stimulated recall interview was conducted shortly after the completion of the lesson. The teacher was interviewed to determine what decision making during the interactive stage. The videotape of the lesson was played back. The teacher was instructed to stop the tape and to explain his/her thoughts that went into the decisions.

After the stimulated recall, the teacher was asked questions to elicit postactive evaluation and reflection. For example:

"Would you rate this lesson as successful?" "Why?"

"Did you gain any information that would be useful in planning future lesson?"

Notes were made concerning the number of students in the classroom, ratio of male to female students, content area taught, grade level, and if adults other than the teacher were present in the classroom. Observation notes were used to identify events that might elicit instructional reflections from the teachers, such as prolonged exchanges with students or transitions from one instructional activity to another. Additional data included the systemic curriculum guidelines of the special school, teachers' plans, classroom calendars, classroom handouts and IEPs.

Analysis

All interviews and stimulated recall records were transcribed, providing a large quantity of information-rich data. Qualitative analysis of this data followed a technique developed as a modification of constant comparative method of Glaser & Strauss (1967). As we searched through the data for regularities and patterns, several themes emerged.

Results

Differences found between decision making of the expert and novice teachers most notably involved in two areas: the integration of the information and the

estimation of students' needs in the preactive stage. During the interactive stage, the major difference of decision making between experts and novices consisted in how they tailored their lesson plan to accommodate students' needs. During the postactive stage, the major difference between experts and novices related to the focus and the depth of their reflection. Each of the three stages required further explanations.

Preactive Stage

During the preactive stage, the major decision points that the teacher made involved: deciding the teaching topics, setting the teaching objectives, selecting teaching materials, grouping students, arranging teachers' duty, and preparing teaching plan. The factors that teachers mentioned affected their decisions including: teacher beliefs, student needs, and environmental factors such as parent's opinions, school policies and teaching experience. The differences between experts and novices were in two areas: the integration of the information and the estimation of students' needs.

When teacher prepared their lesson, they needed to integrate knowledge of curriculum, pedagogical knowledge, content knowledge and knowledge of students to make teaching decisions. This study indicated that expert teachers related more information while planning their teachings. For example, one expert teacher planned to teach students to learn geometry shapes. She considered students' functional levels, their prior knowledge. She also thought of the potential problems that students might encounter and the possible teaching strategies. She related the teaching content to students' life experiences. In addition, she considered the available teaching resource and students' individual difference and set different objectives according to their abilities.

Whereas novice teachers prepared their lessons, they seemed to integrate much narrower scope of information. For example, one novice teacher planned to teach students to know the community facilities. She considered students' life experiences, their interests and individual difference. However, she did not predict the possible difficulties students might encounter, nor did she relate to the pedagogical and content knowledge. Her teaching planning process seemed like a linear way.

The expert teachers seemed to have knowledge that was more comprehensive when they planned their teaching. They integrated different components of their knowledge whereas the novices integrated much narrower scope of knowledge.

Another difference between expert and novice teachers was the ability in

estimating students' needs. The novice teachers had difficulties in estimating students' baseline behavior. This problem affected their decision making especially during the preactive stage. As a result, they usually prepared the lesson either too difficult or too easy for students. One novice teacher said,

"Sometimes I found myself overestimated students' ability. … Sometimes, I was afraid that I underestimated them."

Another novice teacher reported that she planned to teach the concept of time schedule to her students, because she felt every student could read the numeral. However, later on she realized that the low-function students actually were not ready to learn that much.

The expert teachers had more knowledge about students' ability and their learning backgrounds. They estimated students' baseline behaviors more accurately. This strength allowed them having more comprehensive and accurate information to make decisions when they planned their lessons.

Interactive Stage

During the interactive stage, the decisions that both expert and novice teachers made could be classified into two major categories: the managerial and the instructional. The managerial decisions involved the following: handing out worksheets, arranging seats, assigning homework, dealing with students' inattentive behaviors, delivering of reinforcement, making a roll call, etc.

The instructional decisions included the following: dividing students in groups, setting different performance criteria according to students' abilities, prompting students to response, simplifying the tasks, monitoring students' learning, calling students to demonstrate in front of classmates, etc.

The novice teachers seemed to make more managerial decision points than the experts did. They paid more attentions on students' deviate behaviors. Dealing with the behavior problems often interrupted the teaching flow. While off-task behaviors occurred, the novice teachers often stopped teaching activities, and then called students' names to remind him to pay attention or took students' hand to draw him back from deviated behaviors.

Whereas the expert teachers made less managerial decisions, they established class routines to keep the class in order. They prevented the problems by using their voice and body language along with effective teaching skills to motivate students and to keep their attention on learning activities. There were very few inattentive

behaviors occurred in the experts' class. While off-task behaviors occurred, the expert teachers often brought the offending students back to the lesson by body language or asking questions without interrupting of the teaching flow.

The major difference of decision making between expert and novice teachers, during the interactive stage, consisted in how they tailored their lesson plan to accommodate student needs. When the instruction was processing, the expert teachers monitored students' learning behaviors and adapted their lesson in response to student reactions, and modified instructional strategies if necessarily. One expert teacher commented,

"I found the low-level students were confused. … Therefore, I went back a step, just had them classifying cards based on shapes."

Whereas the novice teachers were not flexible as the experts, they seemed to stick closely to their lesson plans. While difficulties or deviated behaviors appeared, the novice teachers sometimes determined to carry out their lesson plans rather than making adaptation of it. For example, the novice teacher A found the teaching materials were too easy for some high-function students, but she did not make any modification of their lesson to meet their needs. The novice teacher B also had the same difficulties. When she found students were not interested in looking pictures, she still presented the pictures one by one and ignored students' inattentive behaviors.

Researches indicated that the difference between expert and novice teachers lied in cognitive structures, such as amount of knowledge, problem representation, and the number of problem solution available. The expert teacher had more knowledge, experiences, and larger repertory of problems and possible solutions. This probably was the reason why they could diagnosis the problem accurately and select approaches to make quick adjustment. As for the novice teachers, they had less knowledge and experiences, possessed smaller repertory of problems and possible solutions in dealing with teaching problems. Therefore, they could not diagnose the problems accurately and could not make immediate adjustment as the experts did. They needed more time and more information to make decisions. One novice teacher mentioned this during an informal interview,

"I was not sure whether he understood or not. I had to figure out what his real problem was, so I did not change my plan. Usually I would consult with my colleagues or find answers from books later."

In the process of instruction, the expert teachers did better than the novices did in

making interactive decisions to adjust students' needs.

Postactive Stage

During the postactive stage, the teacher made reflection about their teaching and made decisions of new actions. The thoughts involved how well their teaching was, how much students knew, whether students already achieved the objectives, or did the teaching activities suit for students, etc. Both the experts and novices made some reflection after their teaching. The major difference between the novices and experts related to the focus and the depth of their reflection. The experts' reflection focused more on: whether the activities were appropriate for students, did all the students achieve the objectives, or how they could improve their instruction? For example:

"*The task was too complex. It was the first time to learn this new skill today; I should reduce the task to 2-3 steps.*"

"*The high-level students all achieved the objectives. But Student A had not yet, he needed more practices. Student B understood the concept already. He might need practice with worksheet one more time.*"

However, the novices focused more on their own teaching activities and students' attention or behavior problems, as one novice teacher commented,

"*Today, students were more involved in the learning activities.*"

"*Students showed more interests in manipulating things.*"

The expert teachers also made deeper reflection than the novices did. They made explanation of cause of the learning problem and proposed improvement suggestions. For example, the expert teacher A said,

"*The low-level students got confused. … Because firstly I asked them to classify cards according to shape, then I added another attribute – color. They were confused. … I felt the low-level group did not achieve the objectives. … They needed one or two more lessons, or related it with everyday life.*"

As for the novice teachers, they made reflections about more surface things such as teaching time, grouping of students, and the seat arrangement. For example, one novice teacher said,

"*Next time, if I encountered the same situation, I should make the adjustment on teaching time, or the number of groups, or the seat arrangement. I thought of those, also I thought of how good I did. I did care about this.*"

Researches on teacher professional development indicated that the beginning teacher cared more about their own needs, whereas the experienced teacher cared

more about students' needs. The reflection of experts and novices revealed similar points. In addition, the expert teachers were better in integration knowledge of their teaching. They evaluated their teaching in depth and had elaborate reflection.

Teacher Belief and Decision Making

This study found that for the most part, teacher decision-making was consistent with their teaching beliefs. This was true especially for the expert teachers. For example, the expert teacher A made decisions, which were consistent with her beliefs. She believed that students had great potential to learn, that teacher should give students more opportunities to try and to help them to overcome difficulties, so that they could reach to higher-level goals. She practiced this belief both in planning and actual teaching stages. She challenged the high-function students by adding something new to see whether they could do or not. She also encouraged the low-function students to response by using various cues and peer modeling strategies. During the stimulated recall, she reflected:

"I felt they had unlimited potential. So I gave them total first, if they could not do it, then I made adjustments. Some people thought they could not learn much. I thought it was their privilege to learn. I did not want to limit them."

The expert teacher B emphasized that the role of special education teacher was to help students to learn happily and to help students becoming the persons whom everybody liked. His belief affected how he taught and managed the class. He did not force students to learn or to write homework, if they did not want to do it. He gave students opportunities to make their own decisions and to learn self-control. At beginning, he requested students to follow the classroom rules restrictively. Gradually, when students were more familiar with the rules, he let students go and did not care much about the rules. In his class, the climate was easy without any pressure. Students seemed to know what to do and everything went smoothly.

The novice teacher A mentioned that students with intellectual disability were very dependent, passive, and were reluctant to try new things. She emphasized that teacher should encourage students to try new things and wait for students' own response. For example, Lily did not work on her worksheet. The novice teacher A reminded her but did not get any response. The novice teacher A held Lily's hand and wrote the first two words, then told her to write the remainder parts by herself. The novice teacher A waited for her response, and gave her praise when she started to write her assignments.

Nevertheless, the novice teacher A's decision making was not always consistent with her teaching belief. For example, although she emphasized the principle of individualized instruction, she still instructed the whole class learning the same materials and doing the same activities. The novice teacher A knew the learning materials, which she arranged for the high-level students, were too simple. However, she still decided to let those students learned the same materials, and access the same activities with low-level students. Because she thought the high-function students could help others to learn. She explained this during the interview as,

"I knew the materials like this were too simple for them, but I wanted the effect that they were in the group. They could lead the class to do whatever things."

In this case, she made decisions not based on her beliefs but considered other factors.

The novice teacher B emphasized that students with intellectual disability needed encouragements. She described that she gave students oral praise when they answered questions correctly or finished a task. In addition, she applied reinforcement system to encourage students when they performed the expected behaviors in the class. The novice teacher B made decisions according to her beliefs in this case. However, on the other situations, her decision making was inconsistent with her teaching beliefs. For example, the novice teacher B emphasized that many students with intellectual disability had attention deficiency. Therefore, it was important to draw students' attention to the teaching process. Nevertheless, when she found several students did not pay attention to the teaching activities, she kept teaching without making any adjustment. Her reflection about this situation was as following:

"At that time, for those students who didn't pay attention, I thought of calling them to look ahead or teaching in small group, but that would waste time, therefore, I didn't make any change and just kept going with my original teaching plan."

Like the novice teacher A, the novice teacher B also made decisions that were not consistent with her belief.

This study found the expert teachers' decisions making were consistent with their teaching beliefs. However, for the novices, this was not always true. Sometimes they were consistent, and the other times they were not.

Discussion and Implications

This study indicated that the expert teachers' teaching beliefs were consistent with their actual teaching behaviors. However, for the novice teacher, this was not

always true. They were inconsistent sometimes. By analyzing the data in-depth, the researchers found that the beliefs which were inconsistent with the novice teachers were those from the educational theory and it might not be internalized to become their own beliefs. Therefore, when the beliefs were in conflict with some environmental factors, the novice teachers made compromise with it and made the decisions that were not consistent with their beliefs. However, the experts' beliefs were strengthened by constantly interacted with teaching field and became firmed. It is, therefore, important for student teachers to explore the beliefs underpinning their own teaching. The teacher education programs should provide opportunities for student teachers to examine and challenge their own beliefs through constant reflection, so that their beliefs will be much clearer and more consistent.

Teachers integrated different types of information when they made teaching decisions. Westerman (1991) pointed out that the major difference between the expert and the novice teachers lied in how they processed information in decision making. This study proved Westerman's point of view. The expert teachers related broader scope of information when they made decisions no matter in preactive, interactive or postactive stages. However, the novice teachers integrated much narrower scope of information in dealing with teaching decisions. The experts seemed to have more comprehensive image of their teaching. This strength allowed them to think thoroughly in preparing lessons and make quick decisions to adjust students' needs.

In addition, this study found another difference between expert and novice teachers. That was the ability of estimation of students' needs. The novice teachers had the difficulties to estimate students' abilities and their baseline behaviors accurately. As a result, they often prepared the lessons that were not suitable for students. Whereas the expert teachers had more knowledge about students' abilities, they knew students' baseline behaviors accurately and planned lessons appropriately. This finding was especially important to special educators. The individualized instructional principle has been emphasized long in special education area. The assessment of students' ability and baseline behavior is one of the basic essential teaching skills to fulfill the individualized instruction. However, the assessment of general ability and the measurement of baseline behavior for planning a lesson should be differentiated.

This study found that the knowledge of students made the difference between expert and novice teachers in making teaching decisions. "Data-based instruction"

should be emphasized in special education teacher preparation programs. The student teachers in the program should master the assessment skills to estimate students' abilities and baseline behaviors accurately.

Another difference between the expert and novice teachers in decision making was that the expert teachers did better than the novices did in making interactive decisions to adjust students' needs when the lesson was proceeding. The possible reasons were as following: First, expert teachers had more knowledge and possessed more repertory of problems and possible solutions than novice teachers did. Secondly, expert teachers integrated much broader scope of information than the novices did when they made an interactive decision. These cognitive structure and information processing strength might allow the experts diagnosed the problems quickly and made immediate adjustment according to students' needs.

Other factors such as the teaching routines might contribute to teachers' interactive decisions. The expert teachers had more teaching experiences. They had more well developed teaching routines than the novices did. This strength might allow them to make interaction decisions and react to the problem immediately.

In addition, the antecedents of interactive decision making should be considered also. By analyzing the data in depth, the researchers found that the novice teachers seemed to pay more attention on students' inattentive behaviors. They made more managerial decisions than the experts did. When off-task behaviors occurred, the novice teachers often made decisions to react immediately. On the contrary, the experts seemed to pay more attention on students' comprehension of learning. When learning difficulties appeared, the expert teachers made decisions to modify their lesson plan to adjust students' needs immediately. It seemed that the antecedents or the problem type affected teachers' interactive decision making. How did it affect the experts and novices' interactive decision making? Further researches need be conducted to clarify it.

The implication for teacher education programs is that teacher education should provide more opportunities for their student teachers to practice decision making and problem solving skills through simulated problem situations. It is important for the novice teachers to aware the reasons for the strategies and options which the expert teachers use.

All the participants in this study reported that the process of reflection imposed by the research made them more aware of their work. Both the expert and novice

teachers mentioned that the stimulated recall interview, watching and discussing their videotaped lessons were very helpful for their professional development. Teachers were forced to think about why they did what they did by the researchers' questions. They thought it helped them to look things from different angle, stimulated them to think different teaching strategies, further then to enhance their teaching skills and professional growth. Teacher education programs can use those methods to promoting teacher reflection, to foster insights into decision making which are unavailable through traditional programs.

Some questions need further investigation in this study. First, Evidence in the data indicated that teacher decision making was consistent with their teaching beliefs for the expert teachers, but not always true for the novices. What factors enter into this phenomenon? Does it relate to the individual differences?

Secondly, a stimulated recall procedure has been frequently used to study teacher's interactive thoughts and decisions (Clark & Peterson, 1986). However, we were not sure if the information presented by teachers were due to the researchers' guiding.

Many factors contributed to teachers' interactive decision making such as teachers' tolerance, alternative strategies, student factors and antecedents of decision making, etc. How do these factors affect the expert and novice teachers' interactive decision making? Further researches need to be clarified it.

References

Bereiter, C., & Scardamaliam, M. (1986). Educational relevance of the study of expertise. *Interchange, 1*(2), 10-19.

Clark, C. (1988). Teacher preparation: Contributions of research on teacher thinking. *Educational Researcher,* 5-12

Clark, C.M., & Peterson, P.L. (1986). Teachers' though processes. In M. C. Wittrock (Eds.), *Handbook of research on teaching*. (3rd ed., pp. 255-296). New York: Macmillian.

Forgarty, J.L., Wang, M.C., & Creek, R. (1983). A descriptive study of experienced and novice teachers' interactive instructional thoughts and actions. *Journal of Educational Research, 77*(1), 22-32.

Gage, N.L., & Berliner, D.C. (1984). *Educational psychology*. Dallas: Houghton Mifflin.

Gagne', E.D.(1985). *The cognitive psychology of school learning*. Boston: Little,

Brown.

Glaser, B.G., & Strauss, A.L. (1967). *The discovery of grounded theory: strategies for qualitative research*. Chicago: Aldine.

Penso, S., & Shoham, E. (2003). Student teachers' reasoning while making pedagogical decisions. *European Journal of Teacher Education, 26*(3), 313~328.

Rogers, D.C. (1995). *Teacher decisions while making instructional changes: an analysis of teacher think alouds*. Unpublished doctoral dissertation, University of Minnesota, Minnesota.

Shieh, B.M. (1996). A study of teaching thought and action between expert and intern teachers. Taipei, Taiwan: Wu-Nan.

Stinson, A.D. (1998). *Why beginning English teachers do what they do*. Unpublished doctoral dissertation, Rutgers, the State University of New Jersey, New Jersey.

Stough, L.M., & Palmer, D.J. (1996). *Expertise in special educators*. Washington, DC: Annual Meeting of the Teacher Education Division of the Council for Exceptional Children. (ERIC Document Reproductions service No. ED 450493)

Stough, L.M., & Palmer, D.J. (2001). *Teacher reflection: How effective special educators differ from novices*. Kansas City, MO: Annual Meeting of the Council for Exceptional Children. (ERIC Document Reproductions service No. ED 463279)

Veenman, S. (1984) Perceived problems of beginning teachers. *Review of Educational Research,* 54, 143-178.

Westerman, D.A. (1991). Expert and novice teacher decision making. *Journal of Teacher Education, 42*(4), 292~305.