Öztürk, A., & Özyurt, M. (2020). The function of metacognition in instructional skills: A comparative case study. *International Online Journal of Education and Teaching (IOJET), 7*(3). 1143-1166. https://iojet.org/index.php/IOJET/article/view/843

Received: 09.03.2020
Received in revised form: 16.05.2020
Accepted: 19.05.2020

THE FUNCTION OF METACOGNITION IN INSTRUCTIONAL SKILLS: A COMPARATIVE CASE STUDY

Case Study

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Abstract

This study aimed to investigate the instructional metacognition of pre-service elementary teachers with high and low level of proficiency on teaching skills. The comparative case study was carried out on six pre-service elementary school teachers, three of whom had high level of proficiency (HLP) and the other three with low level of proficiency (LLP) on teaching skills. The research data were collected through unstructured observation and semi-structured interviews. The data were analyzed through content analysis. As a result of the study, the instructional metacognition (IM) strategies and behaviors adopted by the HLPs and the LLPs during the teaching process were modelled, comparatively evaluated, and similarities or dissimilarities were revealed. The present study is significant in terms of uncovering the function of instructional cognitive awareness in the process of professional development in teacher training, discovering what and how the IM has affected the quality of high and low instructional performances and determining the problems encountered in this process.

Keywords: teacher training, professional development, metacognition, instructional metacognition, effective teaching

1. Introduction

Teachers have a significant impact on the development of positive attitudes towards school and learning, and also on academic achievement (Stronge, 2018), and play an important role in providing effective educational changes (Doğanay & Öztürk, 2011). It suggests the need to increase teacher qualifications in order to obtain meaningful learning outcomes. As a matter of fact, the development of professional development programs for teachers which result in the authentic learning of students is one of the prominent goals of educational systems in the world (Galaczi, Nye, Poulter & Allen, 2018).The professional development of teachers refers to comprehensive, sustainable and systematic learning experiences that based on teacher needs, provide effective teaching, and increase the academic achievement and performance of the students (Reese, 2010). The main purpose of professional development is to develop the professional knowledge and skills of teachers and consequently improve student achievement (Guskey, 2000; Day & Sach, 2005; Reese, 2010). Accordingly, the professional development of teachers can be regarded as the process of improving the qualifications of teachers and providing their professional development in order to realize cognitive, affective and psychomotor learning outcomes pre-eminently. Metacognition plays an important role in the professional development of teachers (Jiang, Ma & Gao, 2016; Duffy, Miller, Parsons & Meloth, 2009). Metacognition, which was first

introduced to the literature by John Flavell, refers to the individuals' knowledge regarding cognitive processes and their results (Flavell, 1976). In other words, meta-cognition can be defined to be noticing what somebody knows and does not know, being aware of mental procedures and strategies, and evaluating and contemplating about the intellectual products (Costa, 1984). According to Flavell (1987), these components were listed to be the knowledge of person, the knowledge of task and the knowledge of strategies under three interrelated and interacting categories while Schraw & Moshman (1995) classified them under the headings of the knowledge of cognition and the regulation of cognition. The information of cognition is divided into declarative knowledge, procedural knowledge and conditional knowledge, and the organization of cognition consists of planning, monitoring and evaluation elements (Schraw, 2001). Moreover, metacognition combines various thinking and reflective processes. They can be divided into five main components which are preparing and planning for learning, choosing and using learning strategies, monitoring how to use the strategy, using different strategies in harmony / organizing various strategies, and evaluating strategy use and learning (Fathima, Sasikumar, & Roja, 2014). Metacognition increases the effectiveness of instruction by creating consciousness and control over the instructional processes of teachers. Metacognition in the teaching process includes being aware of someone's own teaching strategies, knowing when, why and how to apply them, planning what and how to teach, monitoring and controlling the course of lesson while teaching, making adjustments according to the needs, and evaluating after the end of lesson (Hartman, 2002). In the context of decision making during the teaching process, metacognition creates consciousness about instructional decisions and the reasons behind by defining, reflecting and evaluating them (Griffith, Bauml & Quebec-Fuentes, 2016). In addition, it is also essential to prioritize during the teaching process, to recognize and to overcome learning difficulties, to make transfers effectively, and to use teaching materials properly in different ways (Georghiades, 2000). All these functions of metacognition are essential for effective teaching and they reflect the instructional behaviors of chartered or efficient teachers. Effective teachers are characterized by their ability to think, plan and adapt depending on the requirements while teaching (Hoffman & Pearson, 2000). These teachers can set realistic goals, encourage learning, apply participatory and different teaching methods, use time effectively by making comprehensive plans, monitor and evaluate the progress of students through the practices appealing to the students' interests, and provide feedback (Anderson, 2004, McBer, 2000; Jasman, 2002, Liakopoulou, 2011).Furthermore, these teachers can make critical evaluations of what and why they do during their teaching processes, and what are the convenient and inconvenient practices (Brookfield, 1995) in addition to making plans considering many contextual variables such as student characteristics, curriculum, classroom environment, teaching methods and strategies (Tsui, 2003).

The relevant literature includes various research that have been carried out to reveal the effect and function of metacognition on the professional development and specialization of teachers. In this regard, Doganay & Ozturk (2011) investigated science and technology teaching processes of experienced and inexperienced elementary teachers, and Artzt & Armor-Thomas (2001) scrutinized problem-solving skill teaching processes of experienced and inexperienced mathematics teachers in terms of metacognition, and they classified the metacognition components that are on the basis of the teaching process. Moreno (2009) examined and proved the effectiveness of metacognitive prompts in learning. Balcikanli (2011) and Jiang, Ma & Gao (2016) developed instruments for instructional metacognition based on the significant effect of metacognition on the professional development of teachers. Baykara (2011) concluded that there was a significant relationship between pre-service teachers' perceptions of teacher competence and metacognitive learning strategies. Baltaci

(2018), Nahrkhalaji, (2014) and Martinez (2006) determined that the metacognition increased together with the rise in the professional experience of instructors. There are also studies examining the reflections of the teachers' instructional metacognition on their educational processes (Nahrkhalaji, 2014; Curwen, Miller, White-Smith& Calfee, 2010; Wilson &Bai, 2010). They determined that metacognition strategies, namely declarative information, planning, evaluation and management, have significantly been related to the educational performance (Nahrkhalaji, 2014). Curwen, Miller, White-Smith & Calfee (2010) confirmed that the metacognition of teachers regarding their own practices guided students to develop metacognition and to acquire more in-depth knowledge about the subject matter. Wilson, Bai (2010), on the other hand, found that the teachers' metacognition approach has been related to their perception of instructional strategies. All the research results indicate the importance of teachers' instructional metacognition in increasing the effectiveness of the teaching-learning process, improving students' metacognition and earning instructional achievement. However, it has been noted in the literature that the metacognitive skills of teachers boosted with professional experience, and they were less frequently exhibited by inexperienced teachers than the experienced ones (Artzt & Armor-Thomas, 2001; Doganay & Ozturk, 2011). Earning instructional achievement or ensuring students' permanent learning are too important to be built on the fulfillment of the instructional development process of teachers based on professional experience. Therefore, it is considered to be a necessity for teachers to develop their instructional metacognitive skills before graduating from teacher training programs, and the pre-service teachers who had graduated with those skills would provide the students with meaningful and permanent learning, and so they can earn instructional achievement through effectively planning and performing their practices during the teaching-learning process from the very beginning of their profession. That's why, pre-service education has a significant effect on the development of teacher quality (Cochran-Smith & Zeichner, 2005). In addition, how the transition from novice to expertise has been realized during teaching is one of the prominent areas of study in teacher education (Byra & Sherman, 1991). However, the overall examination of the studies in literature yielded that they focused on examining the teaching processes of experienced and inexperienced teachers in terms of metacognitive skills. It was also observed that the research on prospective teachers and metacognition focused on the examination of skill levels or the acquisition of metacognitive skills to a great extent. However, there has been no study investigating the pre-service teachers' instructional metacognition. Improving prospective teachers' instructional metacognition during the pre-service period requires determining the level of development in instructional metacognitive skills as a part of the specialization procedure. A scientific study to examine the instructional metacognition of pre-service teachers will reveal the awareness of their own teaching processes, demonstrate how they have exploited metacognition during this process, and provide information on the qualifications of their professional development. In this regard, a comparative study of the instructional metacognition skills of pre-service teachers with high and low level of proficiency on teaching skills will contribute to the explanation of how the metacognition skills of pre-service teachers are shaped and changed, and the function of metacognition in the process of transition to expertise in terms of instructional skillsthrough determining the problems encountered in this very process. In addition, it is hoped that the research results will contribute to the enrichment of teacher training programs specific to instructional metacognition in terms of determining the needs of teacher candidates for professional development and preparedness to teaching. Furthermore, the present study is considered to be useful as it enables the determination of the function of instructional metacognition in instructional skills and attempts to fill the gap related to the subject matter in literature. Besides, our study is fruitful as it has been conducted with prospective elementary school teachers, the students' metacognition can be improved by that

of teachers(Curwen, Miller, White-Smith, & Calfee, 2010)and young children are quite limited in their knowledge about cognitive phenomena or in their metacognition (Flavell, 1979, Veenman et al. 2006). In line with the aforementioned rationales, this study aimed to investigate the instructional metacognition of pre-service elementary school teachers with high and low level of proficiency on teaching skills.

2. Method

2.1. Research Model

This study, which aimed to scrutinize the instructional metacognition of pre-service elementary teachers with high and low level of proficiency on teaching skills, was designed as a comparative case study (Christensen, Burke & Turner, 2015). Case study is a qualitative research method in which one or more cases are scrutinized comprehensively (Christensen, Burke & Turner, 2015, Lochmiller & Lester, 2017).In case studies, rich and verifiable variety of data can be obtained using more than one qualitative data collection method. Thus, an in-depth and holistic understanding of the case under investigation could be arrived (Yildirim & Simsek, 2018).There are two or more cases in comparative case studies. They are compared through in-depth examination, and differences and similarities are uncovered (Christensen et al., Bogdan & Biklen, 1998).In this study, there are two groups of prospective elementary teachers with high and low level of proficiency on teaching skills. Within the scope of the study, it was aimed to obtain in-depth information about their metacognition regarding teaching processes, to reveal the similarities and differences and to determine the function of metacognition in the differentiation of quality in terms of instructional skills by investigating the instructional metacognition of the groups of teachers who differ in terms of teaching skills.

2.2. Participants of the Study

The participating group were determined through deviant case sampling among purpose sampling methods and consisted of pre-service elementary teachers studying at a state university in Turkey, three of whom had high level of proficiency (HLP) and the other three with low level of proficiency (LLP) on teaching skills. The participants were determined by following a three-step process. In the first step, the central evaluation scores of pre-service teachers for teaching practice (CETP) were taken into account. The CETP scores indicate the quality of instructional skills of pre-service teachers in the process of internship. The CETP scores of pre-service teachers were sorted in descending order to determine the lowest six and the highest six. In the second step, the achievement scores of those pre-service teachers regarding all the pedagogy courses in undergraduate education program were examined and the opinions of the instructors were taken about the teaching skill development of the aforementioned pre-service teachers. In the final step, the instructors who are the advisors of the course of teaching practice were asked to evaluate the pre-service teachers in terms of instructional skill development based on their active practices during lessons. Following these procedures, six pre-service teachers, highest three and lowest three depending on level of proficiency on instructional skills, were determined to be the participants of this study. The participants were included in the study on the basis of willingness after they were informed about the purpose of the study and that their personal information would be kept confidential. The pseudonyms of HLP-1, HLP-2, HLP-3 for the pre-service teachers with high instructional skills and LLP-1, LLP-2, LLP-3 for those with low instructional skills were used. Information about teacher candidates was submitted in Table 1.

Table 1. *The characteristics and pseudonyms of HLPs and LLPs*

The Characteristics of HLPs		*The Characteristics of LLPs*	
HLP-1	The pre-service teacher is a senior at the faculty of education, and she is 21 years old. She had also graduated from the department of child development. She continues her internship training in a primary school with middle socioeconomic status in Gaziantep city centre and has one year of private lesson experience. Her CETP score is AA and the scores of pedagogy courses in undergraduate education are also AA to a great extent. Her undergraduate diploma grade is 3.67.	LLP-1	The pre-service teacher is a senior at the faculty of education, and he is 22 years old. He continues his internship training in a primary school with middle socioeconomic status in Gaziantep city centre and has no teaching experience such as private lessons and etc. His CETP score is CB and the scores of pedagogy courses in undergraduate education are CC to a great extent. His undergraduate diploma grade is 2.87.
HLP-2	The pre-service teacher is a senior at the faculty of education, and she is 21 years old. She continues her internship training in a primary school with middle socioeconomic status in Gaziantep city centre and has three years of permanent private lesson experience. Her CETP score is AA and the scores of pedagogy courses in undergraduate education are also AA to a great extent. Her undergraduate diploma grade is 3.39.	LLP-2	The pre-service teacher is a senior at the faculty of education, and she is 21 years old. She continues her internship training in a primary school with middle socioeconomic status in Gaziantep city centre and has no teaching experience such as private lessons and etc. Her CETP score is CB and the scores of pedagogy courses in undergraduate education are also CB to a great extent. Her undergraduate diploma grade is 2.92.
HLP-3	The pre-service teacher is a senior at the faculty of education, and she is 22 years old. She continues her internship training in a primary school with middle socioeconomic status in Gaziantep city centre, has two years of permanent private lesson experience and has been a voluntary intern for a year in a private primary school to become experienced. Her CETP score is AA and the scores of pedagogy courses in undergraduate education are also AA to a great extent. Her undergraduate diploma grade is 3.63.	LLP-3	The pre-service teacher is a senior at the faculty of education, and he is 21 years old. He continues his internship training in a primary school with middle socioeconomic status in Gaziantep city centre and has no teaching experience such as private lessons and etc. His CETP score is CB and the scores of pedagogy courses in undergraduate education are CC to a great extent. His undergraduate diploma grade is 2.93.

2.3. Data Collection Instruments of the Study

In the study, unstructured observation (camera recordings) and Instructional Metacognition Interview Form were used to collect information about the present condition of HLPs and LLPs in implementing the IM strategies and exhibiting the IM behaviors.

2.4. Unstructured Observation (Camera Recordings)

Through the unstructured observation, it was aimed to collect in-depth information about the instructional metacognition through examining the teaching practices in real-class environment in the course of teaching practice. Within the scope of the study, four-week observation data, one hour per week, were collected from each teacher candidate. The lessons in which teacher candidates can use their instructional metacognition skills effectively were chosen to be observed. Accordingly, observations were held in the courses of mathematics, science, Turkish and social studies.

2.5. Instructional Metacognition Interview Form (IMIF)

The Instructional Metacognition Interview Form (IMIF) was obtained by revising the questions of Metacognition Assessment Interview Form developed by Doganay & Ozturk (2011) to evaluate the IM skills of elementary teachers in science and technology lessons. During the process, the questions were checked in terms of being easy to understand, not being generic and abstract, being open-ended, not being multi-dimensional, and not being directive. In order to ensure validity, the revised form was submitted to the opinions of two faculty members as experts in metacognition, and it was adjusted in line with the obtained feedback. Then, the interview form was finalized after pilot scheme with five prospective teachers. Consequently, four groups of open-ended questions were included in the IMIF (Appendix-1).

2.6. Data Collection

The research data were collected in the spring semester of 2018-2019 academic year. First, observation data, and then interview data were collected in the process of data collection. During the observation procedure, the class was held on the specified days and hours, and it was recorded with a camera without interfering with the teaching-learning process. Camera recording was used to prevent data loss. Therefore, it was possible to monitor in-class behaviors at different times, which enabled the process to be examined by other researchers. Thus, measures were taken for validity and reliability studies. After the end of observations, interviews with prospective teachers were held. During the interviews with prospective teachers, they were firstly informed about the purpose of the study, and it was underlined that their identity and the information they provided would be kept confidential. Firstly, the personal information of teacher candidates was obtained, and then the questions in the IMIF were posed. It was paid attention not to be directive in the course of interviews. Audio recording was used to prevent data loss during the interviewing procedure using semi-structured interview protocol.

2.7. Data Analysis

The analyses were performed to examine the IMs of the HLPs and the LLPs and to reveal the function of the IM. In the analysis procedure carried out to reveal the IMs of the HLPs and the LLPs, the datasets of observations and interviews were analyzed through content analysis among qualitative data analysis methods. Firstly, the datasets of observations and interviews were examined line by line in terms of the IM. Subsequently, codes for the IM behaviors were created. The codes were re-examined and those with similar purposes were

brought together and gathered under distinct IM strategies. In addition, the codes were created for the problems related to the IM behaviors and they accompanied the relevant strategies. The IM strategies and behaviors were modelled according to the instructional stages (preparation, teaching and evaluation).Afterwards, the frameworks related to the IMs of the HLPs and the LLPs were established.

The analyses carried out to reveal the function of the IM were based on the results of the IM analysis of the HLPs and the LLPs. In this regard, inferences about the function of the IM were made by evaluating the qualities (features) of the arrangements done by the HLPs and the LLPs on the basis of the obtained results regarding preparation, teaching and evaluation stages. An example inference was presented in Table 2.

Table 2. *Sample frameworks for inference analysis regarding the functionality of the IM*

STAGE	IM based arrangements of the HLPs	IM based arrangements the of LLPs	Functional implications of the IM
Preparation	Making comprehensive and student-centered plans considering a vast number of variables	Making plans considering few variables	More comprehensive planning Planning student-centered practices
	Scheduling regularly	Not planning regularly	Regular planning
	The provision of materials, activity papers, etc. for preliminary preparation	The improvision of materials, activity papers, etc. for preliminary preparation	Increasing the quality of practices in the process of preliminary preparation

According to Table 2, it can be observed that there are differences between the IM-based arrangements of the HLPs and the LLPs in preparation phase, and the functional implications regarding the IM are based on these differences. In this regard, it has been deduced that the effective use of the IM has functions in making more comprehensive and student-centered plans, planning regularly and increasing the quality of practices such as material development and the preparation of activity papers during the process of preliminary preparation.

2.8. Reliability and Validity of Data Analysis

It was also attempted to ensure the reliability and validity of the research results. Accordingly, the research results were confirmed through gathering data by different data collection methods. The sampling, data collection and data analysis procedures were given in detail as clearly as possible to make sure that each reader can figure out. In addition, observation and interview processes were recorded to prevent data loss and the findings were accompanied by direct quotations to enable the readers to visualize the obtained results. Encoder reliability was used to ensure reliability. In this regard, the researchers analyzed the dataset independently. Then, the researchers came together and compared their coding to get a consensus through discussing the codes with disagreement. After this procedure, the dataset was submitted to the opinion of an independent encoder who was an expert on qualitative research and metacognition. The coding by the independent encoder and by the researchers were compared and the similarities and differences were revealed. For the estimation of the reliability of the analysis results, the reliability formula suggested by Miles & Huberman (1994) was used and the encoder reliability was found to be 97%. After these studies, consensus was arrived regarding the coding with dissensus.

3. Findings

The research findings related to the instructional metacognition of the HLPs and the LLPs were presented under independent frameworks for both groups. They were defined as “the framework related to the instructional metacognition of the HLPs” and “the framework related to the instructional metacognition of the LLPs.”They were given in Figure 1 and Figure 2.

Based on the framework given in Figure 1 regarding the instructional metacognition of the HLPs, it can be concluded that the HLPs exhibit a great many instructional metacognition behaviors during the preparation, teaching and post-implementation evaluation stages. In addition, it was determined that all the HLPs adopted monitoring and organization-based implementation process while teaching.

The framework given in Figure 2 regarding the instructional metacognition of the LLPs implied that the LLPs displayed the IM behaviors during the preparation, teaching and post-implementation stages. However, the IM behaviors were found to be few in number. In addition, it was established that two different approaches, namely practices with and without monitoring and organization, were adopted in the teaching process, and two of the LLPs exhibited the IM behaviors for evaluative purposes after the implementation stage was over.

The findings regarding the instructional metacognition of the HLPs and the LLPs were submitted respectively under three headings of the IM behaviors during the preparation, teaching and evaluation stages.

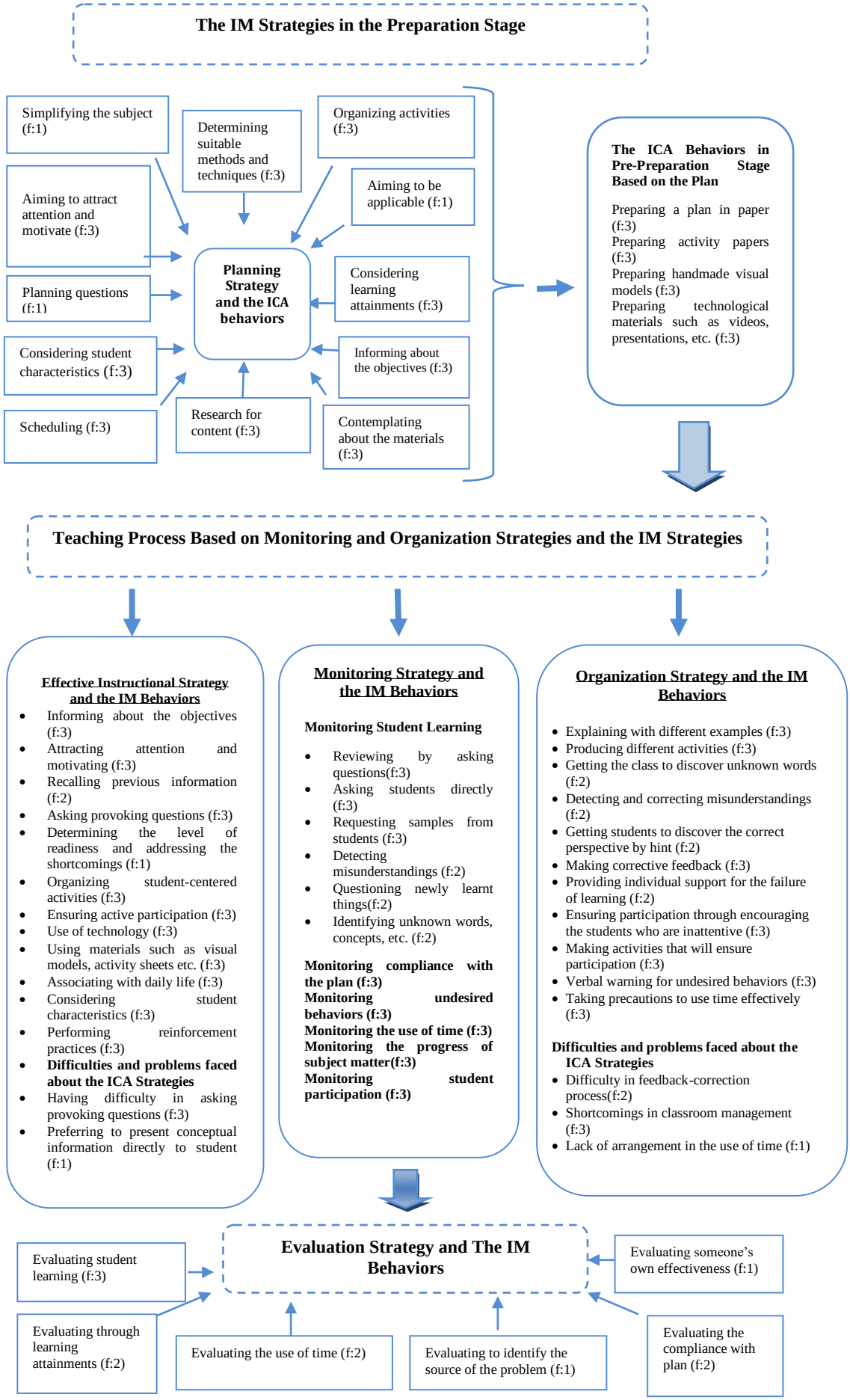

Figure 1. The framework regarding the IMs of the HLP

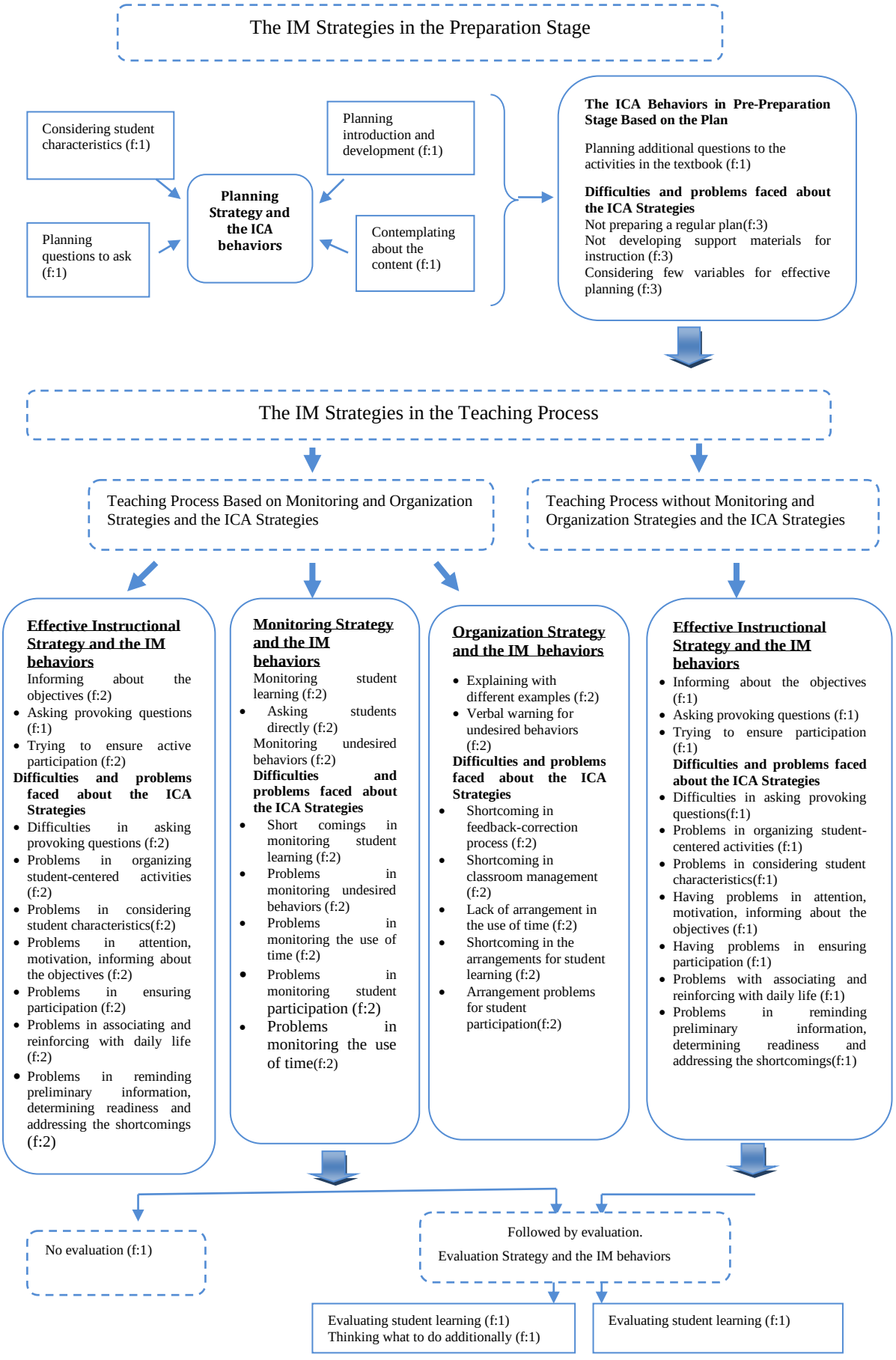

Figure 2. The framework regarding the IMs of the LLPs

3.1. Findings Regarding the IM in the Preparation Stage

The research findings related to both frameworks indicated that the HLPs and the LLPs exploited the planning strategy and the IM behaviors in preparation stage and the pre-preparation stage based on the plan. The findings revealed that the HLPs made more comprehensive planning and exhibited a wide variety of IM behaviors rather than the LLPs. Based on the observations and the interviews, it was also determined that the HLPs regularly made plans in paper in contrast to the LLPs who declared that they planned intellectually, but it wasn't found to be permanent based on the observations. In fact, it was observed that one of the LLPs sometimes came to classes without any preparation and s/he maintained the lesson by asking random questions in his/her own mind. At the same time, it was revealed that the LLPs preferred to follow the textbook instead of making specific and need-based plans, and only one of them prepared questions in addition to the activities in the textbook. It implies that the HLPs and the LLPs have differentiated their IMs regarding planning. When the planning stage is analyzed in terms of the IM behaviors, it was decided that all the HLPs considered the learning attainments, course content and student characteristics, aimed to inform about the objectives, attracted attention and motivated at the very beginning of the lesson, organized activities, determined suitable methods and techniques to achieve the objectives, contemplated about the materials, and scheduled. In addition, unlike the others, one of the HLPs uttered that she prioritized the feasibility of the plan, the other one simplified the subject and the last one worked on the planning of the questions. Unlike the HLPs, no common IM behavior shared by the whole group can be identified in the LLPs. While one of the LLPs voiced that s/he maintained directly from the book, prepared additional questions, and thought about what to do in the introduction and development during the planning process, the other one focused only on the content and contemplated about what to focus on, and the last one expressed that s/he had no information at the beginning and paid attention to the student characteristics in following days. However, when the LLPs were asked to elaborate on what they declared, they were unable to do so. For example, they were unable to provide explanatory information about what they meant "according to the students", how they prepared questions or how they determined what was important in the content. On the other hand, the HLPs stated that they considered the readiness levels, student needs and the way of learning depending on their development levels in relation to student characteristics. One of the HLPs (HLP-1) expressed that she considered the characteristics of children and time planning with *"…frankly, I estimate the duration of my activities in my mind… I prepare by considering what the readiness of children is and how they can learn the subject matter, what they need in that group of age…"*One of the HLPs (HLP-3) explained her practices about the content with *"…I do research on the subject matter. I identify the sub-titles. I determine how I can simplify the subject matter…".*In addition, it was determined that the HLPs highlighted the factors of realizing the learning attainments, being compatible with student characteristics, having the potential to ensure active participation, being student-centered, being feasible with physical conditions with regard to the determination of suitable methods and techniques. In this regard, it can be alleged that they conceived a number of variables in connection with each other during the planning process. In pre-preparation stage based on the plan, it was concluded that the HLPs prepared plans in paper, developed handmade materials such as activity papers and visual models in accordance with their plans, and produced technological materials such as videos, documentaries and presentations. In this regard, it can be claimed that the HLPs exhibited a great many of IM behaviors during the preparation stage.

On the other hand, it was ascertained that the LLPs did not use the IM behaviors effectively in this stage and that only one of the LLPs prepared additional questions for the

activities in the textbook. Considering the shortcomings experienced by the LLPs in both the planning stage and the pre-preparation stage based on the plan, the difficulties encountered in terms of the IM were listed to be not preparing a regular plan, not creating support materials for instruction and taking few features into consideration during the planning process, not making process organization fit for purpose and context (student characteristics, active participation etc.).

The overall evaluation of the findings implies that the HLPs have better IM than the LLPs within the scope of planning strategy and preparation based on the plan. The evaluation of the process in terms of the function of the IM indicates that the effective employment of the IM is effective in planning more detailed and student-centered practices, making regular plans and increasing the quality in the pre-preparation stage when the differences in the planning process with regard to the IM behaviors used by the LLPs and the HLPs are taken into account.

3.2. Findings Regarding the IM in the Teaching Process

When the IM findings related to the teaching process in both frameworks are examined, it can be observed that various IM behaviors have been exhibited within the scope of "Effective teaching strategies", "Monitoring strategies" and "Organization strategies". It was found that the implementation stages of the HLPs and the LLPs differed significantly based on the IM behaviors and the IM problems faced within the scope of these strategies. In this regard, it was revealed that all the HLPs appealed to effective teaching, monitoring and organization strategies in the teaching process and adopted a common instructional approach. On the other hand, it is clear that the approaches adopted by the LLPs during the teaching process differed. In this regard, it is uncovered that two of the LLPs, similar to the HLPs, used effective teaching, monitoring and organization strategies within the scope of the IM, but one of the LLPs benefited solely from effective teaching strategy in this stage. In addition, it was concluded that the IM behaviors within the scope of these strategies in both frameworks differed, and the HLPs exhibited a variety of IM behaviors when compared to the LLPs. The findings related to the IM during the teaching process were presented comparatively under three sub-titles: "Findings regarding effective teaching strategies", "Findings regarding monitoring strategies" and "Findings regarding organization strategies."

3.3. Findings Regarding Effective Teaching Strategies

The teaching strategies for the IM include the awareness of the arrangements to ensure effective learning. According to the framework related to the IM behaviors exhibited by the HLPs, they informed about the objectives, drew attention and motivated, considered student characteristics, determined the level of readiness and addressed the shortcomings, recalled previous information, ensured active participation, organized student-centered activities, utilized technology, asked provoking questions, used materials such as visual models, activity sheets etc., associated and reinforced the course with daily life. It has been determined that the efforts to inform about the objectives, ask provoking questions and ensure participation are also included in the two distinct teaching approaches in the framework related to the behaviors of the LLPs. In addition, the observation findings revealed that the LLPs' behaviors of informing about the objectives were not permanent. It was observed that they only told the purpose of the lesson such as "*Our lesson is problem solving today*" (LLP-1) or they started the lesson by opening the relevant page directly from the book. The observation findings indicated that the HLPs also attracted attention and motivated, determined the level of readiness and addressed the shortcomings, and recalled previous information along with informing about the objectives as a warm-up activity. In this regard, it was noticed that they created awareness about the outcomes of the lesson by attracting students' attention and

motivating them through using a story, case study, attractive questions or materials. It was discovered that the HLPs generally used question-answer or brainstorming methods to address their shortcomings through determining the readiness levels of students. In this context, one of the HLPs practiced the following: In the lesson which was about a reading text on technology, she firstly received the students' opinions through brainstorming to reveal the level of readiness about what technology is, and then, she tried to eliminate the misinformation and disinformation and gave a complete insight of what technology is by evaluating the ideas put forward about technology together with the students. It was witnessed that the practices for recalling previous information by HLPs were mostly conducted as a follow-up study. Considering the IM behaviors performed to be start-up activities, it can be alleged that both the LLPs and the HLPs had awareness for informing students about the objectives in order to attract them for the lesson, but the HLPs carried out more comprehensive studies in this context. In addition, it is possible to say that the LLPs experienced difficulties and shortcomings in relation to the IM in terms of addressing their shortcomings, motivating and informing about the objectives and recalling the preliminary information through determining the readiness levels of the students at the very beginning of the lesson.

It can be claimed that both the HLPs and the LLPs tried to ensure the active participation of students, but the groups differed in terms of the ways of ensuring participation and organizing student-centered activities when the IM behaviors carried out within the scope of effective teaching strategies were evaluated in detail. The HLPs mainly used methods and techniques such as student-centered drama, experiment, learning stations, brainstorming, question-answer or exploited activity materials to ensure the active participation of students. In addition, all students were involved in the implementation stage. However, one of the HLPs, in particular, was found to be tended to present conceptual information directly to children. To exemplify, it was noticed that she directly presented theoretical information about all subtypes of adjectives, and then enabled students to actively participate in the process with questions and activities in a course where she taught the adjectives. In this regard, the preference of presenting conceptual information directly to children has been defined as a difficulty (problem) experienced by the HLPs within the scope of the IM.

It was observed that the LLPs did not use student-centered methods and techniques to ensure the active participation of students other than using question-answer technique, and they basically organized a teacher-centered learning process. In addition, it was noticed that student participation was particularly concentrated on few students in these practices. On the other hand, they followed the textbooks in their teaching processes, did not prepare any additional materials or activity papers, and sometimes taught the lessons without preparation. To exemplify, it was witnessed that one of the LLPs had the students open their notebooks and write down problems from his/her mind even erroneously (just for one time) in one of the math lessons. Thus, it was concluded that they did not make any arrangements considering the student characteristics in practice though they asserted the contrary in the interviews. For asking provoking questions, it was observed that the LLPs directed the questions given in the activities of the textbooks to the students, and only one of them asked a few questions other than the textbook. Accordingly, it was witnessed that the LLP-2 posed questions to the children in Social Sciences such as "*What kind of life would we have had if Mustafa Kemal Atatürk had not started the struggle for liberation?*"It was also observed that the HLPs included provoking questions in their activities, but they were few in number and focused more on informative questions. In light of these findings, it can be asserted that both the HLPs and the LLPs had problems in asking provoking questions. On the other hand, it was determined that reinforcement studies, the use of handmade and technological materials,

associating with daily life had an important place in the teaching processes of the HLPs. For example, in a course about living in space, one of the HLPs taught the lesson with handmade materials and documentaries, actively participated the students in the lesson through the questions she asked, and then performed reinforcement practices. Another HLP also consistently organized activities for students to associate and transfer what they learnt into daily life in a math class where she taught the measurements. On the other hand, it was observed that the LLPs did not carry out studies to reinforce, associate with daily life or transfer other than the textbook, they also did not prepare any additional material, and used the projector only to reflect the textbook. In this regard, it can be claimed that the LLPs have problems with the IM in terms of reinforcement, including technology in the process and using materials, associating with daily life.

The overall evaluation of the findings implies that the HLPs are better in applying the IM strategies and exhibiting the relevant behaviors when compared to the LLPs, but there are various difficulties and shortcomings about instructional metacognition in both groups. In addition, it can be asserted that the contexts with the actively employment of the IM behaviors facilitate adopting a student-centered learning approach instead of a teacher-centered one which positively affects the quality of teaching, incorporating technology into the process, and organizing a learning experience associated with real life and enriched with materials and considering learning shortcomings.

3.4. Findings Regarding Monitoring and Organization Strategies

Monitoring strategies cover organizing teaching activities deliberatively in order to ensure effective learning, to check whether the progress is compatible with the plan, and to reveal the need to make evaluations throughout the process. Organization strategies include making decisions and new arrangements depending on the needs revealed by monitoring strategies to ensure effective learning. When both frameworks were analyzed, it was understood that all the HLPs and two of the LLPs used monitoring and organization strategies except for one of the LLPs. Within the scope of monitoring strategy, the HLPs carried out the IM behaviors for monitoring student learning, monitoring undesired behaviors, monitoring compliance with the plan, monitoring the use of time, monitoring the progress of subject matter and monitoring student participation. It was observed that the IM behaviors related to monitoring undesired behaviors and student learning were also exhibited by the LLPs using this strategy, but the monitoring activities of the LLPs were just limited. Within the scope of organization strategies, the HLPs exhibited various ICA behaviors for student learning, undesired behaviors, the use of time and student participation. It was concluded that the arrangements for undesired behaviors and student learning were also done by the LLPs. The behaviors within the scope of these arrangements differed in both groups.

As a result of the study, it was determined that the HLPs used examining by asking questions, asking students directly, asking students for examples, detecting misunderstandings, questioning newly learnt things, identifying unknown words, concepts, etc. within the scope of the strategies for monitoring student learning. On the other hand, it was found that the LLPs were only able to ask students directly under this strategy .In this context, it was observed that the LLPs asked questions such as “*Is it understood?*”, “*Is there anything you don't understand?*”On the other hand, the HLPs exploited making different activities, explaining with different examples, discovering unknown words, correcting misunderstandings, getting students to discover the correct perspective by hint, giving corrective feedback and providing individual support for lack of within the scope of their arrangements for student learning. However, it was observed that the LLPs only narrated with

a different example. A sample dialogue from the science class can be given for the HLPs' making different activities:

> -Is there anyone want to be an astronaut? Yes, my teacher. - Why do you want to be an astronaut? That's why, I can see the Earth more closely. Do you see more clearly at a distance or it is closer? -When it is closer my teacher…-Actually, we see at a distance as we look from the outside.–I'm going to watch a video about that. Then, you'll better understand what I'm saying (HLP-3).

When the dialogue is analyzed, it can be understood that the abovementioned HLP attempted to make an activity intended to watch videos and to provide visual experience as the verbal explanations were not enough.

Another aspect that needs to be carefully examined during the process is feedback-correction studies. Unlike the LLPs, it was decided that the HLPs made feedback-correction studies to restructure the learning processes of students. In this regard, they used discovering by hints or explaining the correct answer explaining with reasons. However, it was observed that the HLPs did not exhibit these behaviors consistently, and especially one of them used feedbacks such as "right" and "wrong" sometimes or recognizing someone else directly. It was considered to be the difficulties and shortcomings faced by the HLPs within the scope of organization strategies. On the other hand, it was witnessed that the LLPs used only "no" as feedbacks or recognizing someone else directly without any feedback like the HLPs in the feedback-correction process, or they maintained the lesson without explaining why the answer was correct by saying "yes". In this context, one of the LLP scaled the students to the blackboard one by one for the solution of the problems in math classes, chose another one if the answer was wrong by saying "*Sit down*" following "*No*" response to his question of "*Is it right?*" and continued the practice until the correct answer was found. Then, he gave instructions to the class by saying "*Right. Let everyone write*" (LLP-1).It was clear that he did not perform feedback-correction procedures to get the students to discover the mistakes or to explain the reasons of correct answers. It was also considered among the difficulties and shortcomings faced by the LLPs within the scope of organization strategies as in the HLPs. Moreover, the LLPs' having inadequacies in monitoring and organizing student learning indicated the difficulties related to implementing the IM strategies. In addition, the HLPs stated that they checked whether they were progressing according to the plan during the process, and that they maintained the written plan from time to time as well as intellectual inquiry with regard to the implementation of monitoring strategies.

Both the HLPs and the LLPs attempted to prevent undesired behaviors. The pre-service teachers in both groups similarly used verbal warnings with the expressions of "*keep quiet, sit down, listen to the lesson*". However, it was observed that the LLP-2 did not warn or take any precautions for the undesired behaviors of students such as walking around, talking with each other and not listening to the lesson. It was observed in the camera recordings that the advisor had to intervene due to the aforementioned LLP's indifference. While this was considered to be a shortcoming in monitoring undesired behaviors by the LLPs, the solely use of verbal warnings and the permanence of undesirable behaviors indicated that both groups experienced difficulties and shortcomings related to classroom management.

It was observed that only the HLPs included the practices for monitoring student participation and they attempted to provide the participation of all students during the process. Within the scope of organization strategies, they recognized the students who did not participate in the process with the expression of "*You did not attend the course today*" or organized activities to make sure the students' attendance respectively. For example, the HLP-1 used a cube with facial expressions in order to reflect different feelings, and made

creative drama and group animations in a lesson in which emotions were handled. The HLP-2, on the other hand, prepared activity papers and another HLP benefited from learning station method to ensure the participation of all students.

For the use of time and the progress of subject matter within the scope of monitoring and organization, the HLPs made plans to use time effectively, and gave assignments when necessary during the process and when they realized that the students completely understood the subject. Accordingly, one of the HLPs made time arrangement with the expressions of "*Let's answer the first two questions in the activity paper-Let's complete it later-You have already understood it*" (HLP-2).However, one of the HLPs could not complete the lesson when the bell was ringing, that is, she could not fulfill one of the planned activities during one observation solely. On the other hand, all the LLPs had a problem in using time, and the activities were interrupted when the bell was ringing except for two of the observed lessons. In addition, the LLP-3 had a disruption due to the early completion of the activities he prepared, and the advisory teacher gave support of new examples to fill the time.

Based on the overall evaluation of the findings, it can be asserted that the HLPs are better than the LLPs in implementing monitoring and organization strategies. Nevertheless, they had similar characteristics within the scope of arrangements for classroom management in that they exhibited similar behaviors for the use of feedback, correction and time and experienced shortcomings from time to time. In addition, it is possible to say that the effective use of monitoring and organization strategies is useful in maintaining the process in a controlled way, configuring information through correcting the misunderstandings and ensuring the active participation of children.

3.5. Findings Regarding Evaluation Strategy

The evaluation strategy includes determining the quality of the practices following the teaching process, specifying the pros and cons, and getting pre-service teachers to make inferences about their own effectiveness and proficiency. In this regard, all the HLPs and two of the LLPs evaluated the effectiveness of the lesson after it was over. It was revealed that the HLPs exhibited the behaviors of evaluating student learning, evaluating by learning attainments, evaluating the use of time, evaluating to identify the source of the problem, evaluating someone's own effectiveness and evaluating the compliance with plan. It was concluded that the LLPs evaluated what to do additionally and student learning. The assessment of student learning was carried out by three of the HLPs and just one of the LLPs. One of the HLPs uttered that "*I consider whether the students are provided with meaningful and permanent learning*" (HLP-1), and one another highlighted the assessment to identify the source of the problem with "*If children fail, there is a problem. I'm trying to figure out where it stems from. I watched and evaluated the videos with my friends. I noticed that a student did not understand due to misconception. I practiced with him/her and s/he understood the subject…*" (HLP-2). Assessment based on learning attainments and the use of time was highlighted by one of the HLPs with "*I consider the learning attainments and evaluate them. I review time and take notes*". One of the LLPs underlined what can be done differently with "*–Often it doesn't proceed the way I've planned. I ask myself questions, what can I do differently?*" (LLP-1).The assessment of the compliance with plan was voiced by one of the HLPs with "*I contemplate about whether I am compatible with the plan I've made before. I ask whether the activities were in time.*" (HLP-2).When evaluating her effectiveness, one of the HLPs stated that she operated intellectual process to identify the pros and cons with "*…I do this both to evaluate myself and not to repeat my mistakes in following lessons or to perform the good performance again by recognizing my good and bad sides.*" (HLP-1).

The overall evaluation of the findings related to the evaluation strategy indicates that the HLPs had more comprehensive assessment strategies than the LLPs and they exhibited much more IM behaviors. On the other hand, it can be claimed that the LLPs hardly ever displayed IM behaviors for evaluation. To sum up, it is possible to say that the effective use of the IM is functional in determining the effectiveness of the practices performed, identifying the shortcomings, making subsequent practices more effective and increasing the quality of prospective teachers' professional development based on the scope of the IM behaviors employed for the evaluation strategy and the differentiation between the two groups.

4. Discussion and Conclusion

As a result of the study, the IMs of the HLPs and the LLPs regarding planning were differentiated in the preparation stage. It was found that the HLPs regularly made written plans, and all the HLPs considered learning attainments, course content and student characteristics for planning, and aimed to inform students about the objectives, attracted attention and motivated them at the very beginning of the lesson. In addition, it was revealed that the HLPs organized activities, determined suitable methods and techniques to achieve the goals, contemplated about teaching materials, planned time and reflected it to the plan during the preparation stage. Similarly, Tsui (2003) noted that effective teachers make plans by considering a great many contextual variables such as student characteristics, curriculum, classroom environment, teaching methods and strategies. In addition to preparing a plan in paper during the preparation process, it was also ascertained that the HLPs prepared activity papers, handmade visual models and technological materials such as videos and presentations. On the other hand, it was observed the planning practices of the LLPs were not permanent, they preferred to follow the textbook and did not make any preparation for some courses. Similarly, Tok (2010) found that inexperienced teachers had planning problems, and Artzt & Armor-Thomas (2001) concluded that inexperienced teachers adhered to the content of the lesson while experienced ones preferred student-centered lessons similar to the IM behaviors exhibited by the HLPs. It was established that the HLPs had no shortcomings or difficulties while exhibiting the IM strategies and behaviors. The findings yielded that all the LLPs had difficulties and shortcomings in terms of preparing a regular plan, developing supportive instructional materials - developing teaching materials - and taking into account the variables for effective planning. Fernandez & Ritchic (1992) also determined that inexperienced teachers had difficulties in planning the teaching process.

It was uncovered that all participants displayed the IM behaviors in the teaching process within the scope of effective teaching, monitoring and organization strategies, but the instructional approaches of the LLPs varied while all the HLPs exhibited common instructional behaviors. Though both groups carried out activities to inform about the objectives, to ask provoking questions and to ensure participation, the HLPs were also found to display the behaviors such as attracting attention and motivating, considering student characteristics, determining the level of readiness and addressing the shortcomings, recalling previous information, organizing student-centered activities, utilizing technology, using materials such as visual models, activity sheets etc., associating with daily life and performing reinforcement activities permanently within the context of effective teaching strategies. Similarly, Freitas, et al. (2004) discovered that experienced teachers structure their lessons to make the students more active. That's why, a teacher with advanced metacognition can use the knowledge of "when" and "how" effectively during the teaching process (Armor-Thomas, 1989).

The research results indicated that the HLPs had difficulties in only asking provoking questions and shortcomings in terms of presenting the conceptual information directly to the

student within the scope of effective teaching strategies. Besides them, the LLPs had difficulties and shortcomings in all other IM behaviors exhibited by the HLPs. Similarly, Tok (2010) confirmed that inexperienced teachers have difficulty in using teaching materials.

It was concluded that all the HLPs and some of the LLPs implemented monitoring and organization strategies. All of the participants who used the monitoring and organization strategies displayed the IM behaviors for monitoring student learning and monitoring undesired behaviors. In addition, the HLPs also exhibited the IM behaviors for monitoring the use of time, monitoring the progress of subject matter and monitoring student participation. Another research result was that the variety of IM behaviors displayed by the HLPs, but the number of the LLPs was limited. The IM behaviors of the HLPs in monitoring student learning were found to be reviewing by asking questions, asking students directly, requesting samples from students, detecting misunderstandings, questioning newly learnt things, and identifying unknown words, concepts, etc. while the LLPs solely preferred asking students directly. While no difficulties or shortcomings have been identified in HLPs' implementing monitoring strategies, the LLPs had difficulty in monitoring student learning and undesirable behaviors, and were inadequate in monitoring the use of time, the progress of subject matter and student participation. Tok (2010) also revealed that inexperienced teachers had problems in subject matter knowledge, the use of teaching materials, time management and behavior management. The LLPs' lack of monitoring student learning, use of time, undesirable behaviors, and the progress of subject matter may be caused by their having difficulties in preparing plans and considering variables for effective planning and their lecturing unpreparedly on occasion. That's why; the success of the course depends on good planning and the effective implementation of the plan. Planning ensures the determination and effective use of time devoted to a particular subject matter (Koc, 2009), and thus, a great many classroom management problems can be prevented (Arends, 1998).

The research findings regarding organization strategies implied that both groups exhibited the IM behaviors to control student learning and undesired behaviors. However, it was determined that the IM behaviors of the HLPs were much more composite. Zohar (2006) also ascertained that metacognition enables teachers to organize learning activities depending on student characteristics, objectives and situational conditions. It was found that both groups had shortcomings in the IM behaviors related to feedback-correction process, classroom management and the use of time within the scope of organization. In addition, the LLPs had shortcomings both in the arrangements for student learning and for student participation. Artzt & Armor-Thomas (2001) also revealed that inexperienced teachers were unable to adjust their plans according to the learning characteristics of the students and strictly adhered to the available plans. It can also be regarded as a reflection of the shortcomings on the IM behaviors of the LLPs regarding monitoring. That's why, organization strategies are shaped on the basis of monitoring strategies. Thus, it is hardly possible to expect an organization strategy to be followed for non-monitored IM behaviors.

Regarding the use of evaluation strategies, the participants in both groups, apart from one of the LLPs, were found to make evaluations about the effectiveness of the lesson after it was over. While the HLPs evaluated a great number of aspects such as student learning, learning attainments, use of time, the determination of the source of the problem, compliance with the plan, and the assessment of their own effectiveness, the LLPs exhibited limited number of IM behaviors only in terms of what can be done additionally and evaluating student learning. Similarly, Fernandez & Ritchic (1992) determined that inexperienced teachers are inadequate in evaluating student learning. Artzt & Armor-Thomas (2001), on the other hand, found that inexperienced teachers perceive themselves as people who distribute information and are weak in providing feedback to students.

In summary, the HLPs demonstrated a wide variety of IM behaviors than the LLPs and were more effective in terms of the use of evaluation strategies within the context of reflections during and after implementation as in planning, effective teaching, monitoring and organization strategies. Ozturk & Doganay (2011) also found that experienced teachers are more successful in implementing monitoring, organization and planning strategies than the inexperienced ones. That's why, effective teachers with high instructional skills can make critical evaluations of what and why they do during their teaching process, and what are the convenient and inconvenient practices (Brookfield, 1995).

As a result of the study, both the HLPs and the LLPs were found to exhibit several instructional metacognition behaviors during the preparation, teaching and evaluation stages of instructional activities. While all the HLPs often exhibited these behaviors in all stages of the teaching process in an effective and composite way, the LLPs displayed limited number and variety of them from time to time. In addition, the active employment of IM behaviors positively affected the quality of education, and furthermore, contributed to the adoption of a student-centered learning approach rather than a teacher-centered one, to the inclusion of technology in the process, and to the organization of real life-related learning experiences based on student characteristics. According to Wilson & Bai (2010), there is a relationship between teachers' understanding of metacognition and their perceptions about teaching strategies. In light of these, it can be alleged that the IM has an important function in the development process of teaching skills. Marchant (1989) pointed out that metacognition increases the effectiveness of teachers. Similarly, Wen (2012) emphasized that the use of metacognition enables teachers to enrich lesson plans, monitor and evaluate teaching. In this regard, it is important to focus on the planning of teacher training programs that will improve the instructional metacognition of prospective teachers.

In light of the research results, program developers and practitioners were recommended to include plans that will improve the instructional metacognition of teacher candidates into teacher training programs. In particular, courses such as Teaching Practice and School Experience can be handled in this context. The present study was carried out with prospective teachers studying at the department of elementary teaching. In addition to similar studies to be conducted with teachers, the reflections of instructional metacognition on students can be addressed in different studies within the context of learning, the permanence of learning, attitudes towards the course and academic achievement. Moreover, the researchers were recommended to study on program development to enrich teacher training programs and in-service training programs with instructional metacognition development by conducting in-depth research on how to improve the instructional metacognition of teachers and prospective teachers.

5. Conflict of Interest

The authors declare that there is no conflict of interest.

6. Ethics Committee Approval

The authors confirm that the study does not need ethics committee approval according to the research integrity rules in their country.

References

Arends, R. I. (1998). Resource handbook: Learning to teach. Boston: McGraw-Hill. Retrieved on 22.04.2020 from https://hasanahummi.files.wordpress.com/2017/04/connect-learn succeed-richard-arends-learning-to-teach-mcgraw-hill-2012.pdf

Armour-Thomas, E. (1989). The application of teacher cognition in the classroom: A new teaching competency. *Journal of Research & Development in Education, 22*(3), 29 37.

Artzt, A., & Armour-Thomas, E. (2001). Mathematics teaching as problem solving: SA framework for studying teacher metacognition underlying instructional practice in mathematics. H. J. Hartman (Ed.), In *Metacognition in learning and instruction* (pp.127-148). Netherlands: Kluwer Academic Publishers.

Balcikanli, C. (2011). Metacognitive awareness inventory for teachers (MAIT). *Electronic Journal of Research in Education,* 9(3), 1309-1332. doi:10.5539/jel.v6n4p78

Baltaci, A.(2018). School Administrators' Metacognitive Awareness Levels. *Trakya Journal of Education*, *8*(4), 840-854. doi: 10.24315/trkefd.313693.

Baykara, K. (2011). A study on "teacher efficacy perceptions" and "metacognitive learning strategies" of prospective teachers. *Hacettepe University Journal of Education*, *40*(40), 80-92. Retrieved on 19.02.2020 from: http://efdergi.hacettepe.edu.tr/shw_artcl396.html

Bogdan, R. C. & Biklen, S. K. (1998). *Qualitative research for education: An Introduction to theory and methods*. Boston: Allyn and Bacon Publications.

Brookfield, S. B.(1995). *Becoming a critically reflective teacher*. San Francisco: Jossey Bass.

Byra, M., & Sherman, M. (1991). *Preactive and interactive decission of experienced and inexperienced novice teachers*. Paper presented at the Round table presentation at the annual meeting of the American Educational Research Association, Chicago, IL.

Christensen, L. B., Burke Johnson, R., & Turner, L. A. (2015). *Research methods design and analysis*. (A. Aypay, Trans.). Ankara: Anı Publishment.

Cochran-Smith, M., & Zeichner, K. (2005). *Studying teacher education: The report of the AERA panel on research and teacher education.* Mahwah, NJ: Erlbaum.

Costa, A. (1984). "Thinking: How do we know students are getting better at it?" *Roeper Review*: *A Journal on Gifted Education,* 6(4), 197-199. doi:10.1080/02783198409552809.

Curwen, M. S., Miller, R. G., White-Smith, K. A., & Calfee, R. C. (2010). Increasing teachers' metacognition develops students' higher learning during content area literacy instruction: Findings from the read-write cycle project. *Issues in Teacher Education.* 19(2), 127-151. Retrieved on 20.01.2020 from:https://files.eric.ed.gov/fulltext/EJ902679.pdf

Doganay, A., & Ozturk, A. (2011). An investigation of experienced and inexperienced primary school teachers' teaching process in science and technology classes in terms of metacognitive strategies. *Educational Sciences: Theory and Practice*, *11*(3), 1320-1325.

Duffy, G. G., Miller, S., Parsons, S., & Meloth, M. (2009). Teachers as metacognitive professionals. D.J. Hacker, J. Dunlosky, A.C. Graasser (Eds.).In *Handbook of metacognition in education* (pp.240-256). doi: 10.4324/9780203876428.ch13.

Fathima, M., Sasikumar, N., & Roja, M. P. (2014). Enhancing teaching competency of graduate teacher trainees through metacognitive intervention strategies. *American Journal of Applied Psychology*, *2*(1), 27-32. doi: 10.12691/ajap-2-1-5.

Fernandez, T. F., & Ritchic, G. R. (1992). Reconstructing the interactive science pedagogy: Experiences of beginning teachers implementing the interactive science pedagogy. *Research in Science Education*, 22, 123-131. doi: 10.1007/BF02356887.

Flavell, J. H. (1976). "Metacognitive Aspects of Problem Solving", In L. Resnick (Ed.), The Nature of Intelligence (s.231-235), Hillsdale, NJ: Lawrence Erlbaum Associates.

Flavell, J. H. (1979). Metacognition and cognitive monitoring: A new area of cognitive developmental inquiry. *American Psychologist, 34*(10), 906911. doi:10.1037/0003 066X.34.10.906

Flavell, J. H. (1987). Speculations about the nature and development of metacognition. In F. Weinert & R. Kluwe (Eds.), Metacognition, motivation, and understanding (pp. 21 29). Hillsdale, NJ: Erlbaum.

Freitas, I. M., Jiménez, R., & Mellado, V. (2004). Solving physics problems: The conceptions and practice of an experienced teacher and an inexperienced teacher. *Research in Science Education, 34*(1), 113-133. doi: 10.1023/B:RISE.0000021000.61909.66.

Galaczi, E., N., A., Poulter, M., & Allen, H. (2018). Teacher professional development. Cambridge: UCLES. Retrieved on 11.09.2019 from https://www.cambridgeenglish. org/Images/539683perspectivesteacherprofessional-development.pdf

Georghiades, P. (2000). Beyond conceptual change learning in science education: Focusing on transfer, durability and metacognition. *Educational Research, 42* (2), 119-139. doi: 10.1080/001318800363773.

Griffith, R., Bauml, M., & Quebec-Fuentes, S. (2016). Promoting metacognitive decision making in teacher education. *Theory into Practice*, *55*(3), 242-249. doi: 10.1080/00405841.2016.1173997.

Guskey, T. R. (2000). *Evaluating professional development*. California: Corwin Press.

Hartman, H. J. (2001). Metacognition in science teaching and learning. H. J. Hartman (Ed.), In *Metacognition in learning and instruction* (pp.127-148). Netherlands: Kluwer Academic Publishers.

Hoffman, J., & Pearson, P. D. (2000). Reading teacher education in the next millennium: What your grandmother's teacher didn't know that your granddaughter's teacher should. *Reading Research Quarterly*, *35*(1), 28-44. doi: 10.1598/RRQ.35.1.3

Jiang, Y., Ma, L., & Gao, L. (2016). Assessing teachers' metacognition in teaching: The teacher metacognition inventory. *Teaching and Teacher Education*, *59*, 403-413. doi: 10.1016/j.tate.2016.07.014.

Koc, G. (2009). Öğretimin planlanması ve uygulanması [Planning and implementation of teaching], A. Doganay (Eds), In *Ögretim ilke ve yöntemleri* [Teaching principles and methods], (385-421). Ankara: PegemA Publications.

Liakopoulou, M. (2011). The Professional Competence of Teachers: Which qualities, attitudes, skills and knowledge contribute to a teacher's effectiveness. *International Journal of Humanities and Social Science*, *1*(21), 66-78. Retrieved on 12.01.2020 from https://www.academia.edu/28086348/The_Professional_Competence_of_Teachers_Whichqualities_attitudes_skills_and_knowledge_contribute_to_a_teachers_efectivness

Lochmiller, C.R. & Lester, J.N. (2017). An Introduction to educational research. London: Sage Publications.

Marchant, G. J. (1989). Metateaching: A metaphor for reflective teaching. *Education*, 109, 487-489.

Martinez, M. E. (2006). What is metacognition? *Phi Delta Kappan*, *87* (9), 696-699. doi: 10.1177/003172170608700916.

Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook* (2nd ed.). Thousand Oaks and London: Sage.

Moreno, R. (2009). Learning from animated classroom exemplars: The case for guiding student teachers' observations with metacognitive prompts. *Educational Research and Evaluation*, *15*(5), 487-501. doi: 10.1080/13803610903444592.

Nahrkhalaji, S. (2014). EFL Teachers' metacognitive awareness as a predictor of their professional success. *International Journal of Social, Behavioral, Educational, Economic, Business and Industrial Engineering*, *8*(6), 1665-1669. Retrieved on 10.01.2020 from https://publications.waset.org/9998414/efl-teachers-metacognitiveawarenessas-apredictor-of-their-professional-success

Reese, S. (2010). Traditional or alternative finding new teachers along different pathways. *Techniques: Connecting Education and Careers (J1)*, *85*(1), 16-21. doi:10.117/10570837030130001010 2.

Sachs, J. (2005). Teacher education and the development of professional identity: Learning to be a teacher. P.M. Denicolo & M. Kompf (Eds.) In *Connecting policy and practice: Challenges for teaching and learning in schools and universities* (pp. 5-21). Routledge: Taylor and Francis Group.

Schraw, G. (2001). Promoting general metacognitive awareness. H. J. Hartman (Ed.), In *Metacognition in learning and instruction* (pp.127-148). Netherlands: Kluwer Academic Publishers.

Schraw, G., & Moshman, D. (1995). Metacognitive theories. *Educational Psychology Review*, 7(4), 351–371. doi:10.1007/BF02212307

Stronge, J. H. (2018). *Qualities of effective teachers*. USA: ASCD.

Temur, Ö. D., Özsoy, G., & Turgut, S. (2019). Metacognitive instructional behaviours of preschool teachers in mathematical activities. *ZDM*, 51(4), 655-666. doi: 10.1007/s11858-019-01069-1.

Tok, S. (2010). The problems of teacher candidate's about teaching skills during teaching practice. *Procedia-Social and Behavioral Sciences*, *2*(2), 4142-4146. doi: 10.1016/j.sbspro.2010.03.654.

Tsui, A. B. (2003). Characteristics of expert and novice teachers. In *Understanding expertise in teaching*: *Case studies in ESL teaching* (pp.22-41). England: Cambridge University

Press. Retrieved on 17.11.2019 from https://www.eflbooks.co.uk/samples/ 9780521635691.pdf

Veenman, M. V. J., Van Hout-Wolters, B. H. A. M., & Afflerbach, P. (2006). Metacognition and learning: conceptual and methodological considerations. *Metacognition and Learning*, 1, 3–14.

Yildirim, A. & Simsek, H. (2018). *Sosyal bilimlerde araştırma yöntemleri* [Research methods in social sciences]. Ankara: Seckin Publishing.

Wen, Y. H. (2012). A study on metacognition of college teachers. *The Journal of Human Resource and Adult Learning, 8*(1), 80- 91. Retrieved on 19.11.2019 from http://www.hraljournal.com/Page/9%20Wen,%20Ya-Hui.pdf at 12.11.2019.

Wilson, N. S., & Bai, H. (2010). The relationships and impact of teachers' metacognitive knowledge and pedagogical understandings of metacognition. *Metacognition and Learning, 5*(3), 269-288. doi: 10.1007/s11409-010-9062-4.

Zohar, A. (2006). The nature and development of teachers' metastrategic knowledge in the context of teaching higher order thinking. *The Journal of the Learning Sciences, 15*(3), 331-377. doi: 10.1207/s15327809jls1503_2.

Appendix-1

6.1. Interview Questions

· Do you plan before the teaching process?
- If so, how do you plan and what do you consider? Please explain.
- If not, can you explain why?

· Do you check whether your lessons maintain as you planned during the teaching process?
- If so, how do you do? –Why do you need to do such a control? Or what prompts you to do so? Please explain why?
-If not, please explain why?

·Would you take any precautions if the teaching process does not maintain as you planned? Or do you make new arrangements?
- If yes, what would you do?
- If no, why not? Please explain why?

· Do you evaluate on whether the lesson maintained the way you had planned after it was over?
- If so, how do you assess? What triggers you to make such an assessment? Please explain.