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Adopting Mediated Learning Experience through Mediational Behaviors to Improve EFL Learners' Grammar and Metacognitive Strategy Use

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Abstract
Mediated Learning Experience (MLE) Theory holds the idea that a crucial factor in the development of a person's cognitive functioning and enabling him to function as an autonomous learner is the amount and quality of mediated learning interactions he has received. Given this, the paramount focus of this study was to implement MLE through mediational behaviors regarding developing EFL learners' metacognitive strategy use (MSU) and grammar knowledge. To this end, a grammar test and the Persian version of the Metacognitive Strategies Questionnaire by Item Types were administered to 60 Iranian elementary EFL learners who were selected through convenience sampling and assigned to experimental and control groups at the pre-test and post-test. Quantitative analysis of the data revealed that an MLE-based grammar course done through mediational behaviors improved not only the learners' use of metacognitive strategies as a total but also the learners' use of planning strategies and their grammar knowledge as well, it did not improve their use of goal-setting and assessment strategies, instead. The results can bear some lucrative insights for various practitioners ranging from teachers and teacher trainers to syllabus designers and stakeholders.

Keywords: Mediated Learning Experience; Mediational behaviors; Metacognitive strategy use

INTRODUCTION

The works of Piaget and Vygotsky are well-known among most educators, the work of Reuven Feuerstein and his theory of Mediated Learning Experience (MLE) (Feuerstein, 1990; Feuerstein & Feuerstein, 1991; Feuerstein et al., 1985) despite being so influential in exploring new ways to facilitate learning especially in the late modern knowledge-based era in which there is an increasing search for educational methodologies emphasizing on multi-disciplinary learning, entrepreneurship, independent learning, and higher-order thinking skills is less famous, instead. Piaget is popularized for his extensive insights concerning intelligence and the structures of the mind. Vygotsky's work underlines the importance of the environment and social processes in developing internalization based on the theory of Zone of Proximal Development. In essence, Feuerstein's Mediated Learning Experience theory anchored in Piaget's constructivist theory is an endeavor to operationalize Vygotsky's social constructivist theory. Put another way, Piaget, Vygotsky, and Feuerstein's theories of learning emphasize the

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importance of cognition, contextualization, and mediation respectively (Tan, 2000).

In this regard, Tzuriel (1991, p. 31) proposed "the main difference between Vygotsky and Feuerstein relates to the level of theoretical elaboration and operationalization of the theoretical concepts into applied systems. Unlike Vygotsky, Feuerstein has developed the concept of MLE by suggesting an elaborated list of MLE criteria" and a conceptual framework defining two kinds of cognitive development determinants, i.e., distal determinants and proximal ones. Kozulin and Presseisen (1995, p. 69) explain "organismic and environmental factors constitute only distal determinants of cognitive development, whereas mediated learning experience (or lack of it) constitutes the proximal determinant". As an illustration, cognitive development can be nurtured irrespective of one's age and stage of development. In this regard, Feuerstein (1990) argued that a person's genetic endowment or neurophysiological background is not the sole determinant of his capacity to learn. Briefly then, a person's cognitive functioning is directly related to the amount and quality of mediated learning experiences he has received.

Believing in the possibility to intervene in the development of human cognitive abilities through MLE has been popularized as Feuerstein's Structural Cognitive Modifiability theory (Poehner, 2008). Simply put, Feuerstein's Structural Cognitive Modifiability theory (1990) posits that a person's cognitive functioning is modifiable and autoplastic rather than stable and immutable

(Feuerstein et al., 1988). The ultimate purpose of mediated learning interactions is to develop the learner's cognitive functioning and enable him to function as an independent and autonomous learner and learn how to learn through mediation. Thus, the very heart of MLE is mediation. In this regard, Feuerstein et al. (1981) proposed two various basic situations under which learning might take place: direct versus mediated learning.

In direct, nonmediated learning, namely Teacher-Learner Model, learning takes place through the learner's direct exposure to sources of stimuli by the teacher. As an illustration, in nonmediated learning, the learner interacts with the environment in a direct, trial-and-error, incidental, and haphazard manner. On the other hand, in mediated learning, i.e., Mediator-Learner Model, learning happens with a warm human being's mediational assistance. In other words, in mediated learning, an intentional adult mediator "intervenes in the process by placing himself or herself between the learner and the stimulus and between the learner and the response" (Feuerstein, 2000, p. 558). In a nutshell, developing quality interaction by a well-intentioned mediator plays a pivotal role in the cognitive development of the learner.

As mentioned above, Feuerstein has developed the concept of MLE by suggesting an elaborated list of MLE criteria. He has clarified that every interactive experience between an adult and a child or a teacher and a learner can not be considered an MLE interaction. As such, Feuerstein et al. (1988, pp. 61-62) have listed 11 criteria for an MLE interaction. All 11 parameters and their definitions are presented here. All but the first three definitions are adapted from Feuerstein et al. (1988).

1. Intentionality and reciprocity - this requires the mediator to have a clear intention for the interaction, shares the intentions with the learner and the learner responds to the intentions (Seng, Pou & Tan, 2003).

2. Mediation of meaning - the mediator helps the learner to find meaning or value in a learning experience by paying attention to the learner's emotional, attitudinal, motivational, and value orientation of a child (Presseisen and Kozulin, 1994).

3. Transcendence - interactions in which the mediator goes further than the immediate and/or concrete needs of the children and tries to reach for goals that are beyond the specific situation or directly related to the original activity (Isman & Tzuriel, 2008, p. 548).

4. Mediation of feelings of competence - offering various forms of assistance to help the learner to successfully complete a task previously perceived as too difficult and interpreting to him the meaning of his success.

5. Mediated regulation and control of behavior - regulation of the child's impulsivity and

attention in ways that lead to the child gradually taking on more and more responsibility for the control of his own behavior.

6. Mediated sharing behavior – involves the mediator communicating to the learner her own orientation to the task, her perception of its demands, reactions to problems that arise, and feelings at various stages of task completion while also attempting to elicit the child's feelings and perceptions, emphasizing the joint nature of the interaction.

7. Mediation of individuation and psychological differentiation – emphasizes the learner as an individual with thoughts, feelings, and abilities that may be different from but can certainly complement those of others.

8. Mediation of goal seeking, goal setting, goal planning, and achieving behavior – proposing and perceiving goals; planning specific actions, including the achievement of subgoals that will lead to task completion; using representational modes of thinking; and execution of problem-solving strategies.

9. Mediation of challenge: The search for novelty and complexity – attempts to mediate an activity the learner has already mastered will not produce the feeling of competence described above and may lead to boredom and frustration. MLE tasks should target what the learner is not yet capable of doing independently.

10. Mediation of an awareness of the human being as a changing entity – the core of Feuerstein's SCM theory, the belief that all human beings are modifiable.

11. Mediation of an optimistic alternative – related to the above, the insistence that individuals can be more than their present abilities suggest.

Meticulously surfing the literature, the researcher encountered different points of view in respect of implementing MLE theory. Some scholars such as Poehner (2008) confine MLE to a dynamic assessment methodology and call it "Feuerstein's approach to DA" (p.52). Some others regard MLE as an integrative and comprehensive approach to designing a course and preparing a program. Another point of view regarding MLE belongs to Singaporean educators and academics who champion the implementation of MLE for different learners and different contexts not only in the classroom but also at home, as well as in counseling situations by designing an MLE-based lesson plan and operationalizing MLE principles throughout the lesson plan.

They believe in "a great need for pedagogy and intervention to be informed by MLE and its applications" and are hopeful that "more educators and school counselors will apply MLE in realizing the cognitive, emotional and motivational development of learners" (Chua & Wong, 2016, p. ii). As an illustration, MLE attracts the attention of scholars, researchers, and practitioners in Singapore and culminated with the setting up of the Mediated Learning Lab (MLL) at the National Institute of Education in 2016. Ping (2016, p. 73) states "The use of MLE as a tool in education is indeed a powerful one. Its potential as an educational tool is only just being touched in Singapore".

In respect of the first point of view, Poehner (2008) regards MLE as a dynamic assessment methodology because Feuerstein's model integrates assessment and instruction so that they are indistinguishable from each other and do not exist apart. As an illustration, in Feuerstein's MLE approach, a mediator or assessor usually engages in a task with a learner providing as much mediation and as many forms of mediation as possible, i.e., intensive MLE, and keeps track of the learner's responsiveness to the mediation throughout the interaction and makes changes accordingly. As such, providing the learner with intensive mediation in a session by the assessor is the essence of dynamic assessment. Some of the studies which look at MLE as a dynamic assessment methodology are presented in the following paragraphs. Mostly, these studies tried to explore the effect or relation of MLE as a total or principles of MLE on learners' success in the games, improvement in cognitive functioning, or performance in academic scores.

Klein et al. (2003) found that the frequency of mediational behaviors (focusing, affecting, encouraging, expanding, and regulating) in preschoolers' interaction with their toddler siblings analyzed by the observing mediational

interaction (OMI) scale was related to the younger siblings success on the games. Elsewhere, Tzuirel (1996) indicated that MLE interaction scores analyzed and measured by Klein's MLE Observation (OMI) scale were positively related to the SES level of participants (mother and their child) and higher in the free-play situation than in the structured one, especially in the high SES group. Moreover, cognitive performance was significantly predicted by the Total MLE or by MLE principles scores in the structured situation.

In another study, Lidz et al. (1991) tried to study the relationship of cognitive functioning of preschool children measured by McCarthy Scales to MLE components during mother-child interactions. They showed that the transcendence principle correlated positively with the McCarthy score and the reciprocity principle correlated negatively with the McCarthy score, instead. Another example is a study by Klein et al. (1987) which tried to examine the relationship between cognitive performance difficulties of 3-year-old very low birth weight children and styles of paternal interaction with them. The results indicated that MLE principles were significantly correlated with children's cognitive performance, but the birth weight was not significantly correlated with their cognitive performance.

The other research considering MLE as DA is a study by Seabi and Amod (2009) which revealed a significant improvement in cognitive functioning scores measured by the Raven's Coloured Progressive Matrices in Individual Mediation participants rather than Group Mediation ones. The intervention phase for the Group Mediation participants lasted only three hours while it was one-to-one interaction and ranged from two to four hours for a week for the Individual Mediation ones. The researchers tried to implement MLE principles during the mediation process for both groups. Elsewhere, Skuy et al. (2002) showed that both the African and non-African groups excelled over the baseline on the Raven's Standard Progressive Matrices in comparison with the control groups. As an explanation, Raven's pre-test was administered on the first day, Set Variations II of the LPAD as the mediation task for the experimental group on day eight, and Raven's post-test on day eighteen. As such, the experimental group was exposed to the mediated learning experience.

Concerning the second viewpoint, that is, MLE as a basis for preparing a program, Haywood et al. (1985) designed an MLE-based curriculum, that is, the Cognitive Curriculum for Young Children (CCYC) to stimulate intrinsic motivation and the cognitive development of preschool at-high-risk and handicapped children. The CCYC is anchored in ideas from Piaget and Vygotsky, and specially Feuerstein, and uses the mediational teaching style. The mediational teaching style is the most important and prominent characteristic of the teacher's behavior in a cognitive curriculum. As an explanation, the teacher behaves as a catalyst and a facilitator rather than just a content disseminator. Cognitive-mediational teachers constantly examine their interaction with the learners to determine to what extent they meet the principles of MLE. The CCYC consists of five basic components: the mediational teaching style, the small-group cognitive units, the cognitive-mediational method of behavior management, the parent-education component, and ancillary services.

After developing CCYC, Haywood et al. (1985) tried to evaluate the curriculum by choosing a sample of 27 handicapped and 48 high-risk children who received one year of CCYC and 44 high-risk children who were exposed to the non-cognitively Project Head Start program for one year. Both groups were tested before and after the program on the McCarthy Scale of Children's Abilities (a General Cognitive Index and specific scores on Verbal Performance, Perceptual Performance, Memory, and Motor Abilities). In conclusion, the handicapped and the high-risk experimental groups excelled over the control group on the General Cognitive Index. The high-risk CCYC children outperformed significantly on three of the four subscales and the handicapped showed significant improvement on all four.

In addition, Feuerstein himself designed an MLE-based program, that is, Feuerstein Instrumental Enrichment Program (FIE). This

cognitive education program began in the 1950s. FIE is a classroom curriculum designed for the enhancement of learning potential and cognitive functions essential for academic learning and achievement (Feuerstein, 2000). Moreover, Feuerstein et al. (1988) define IE as "a program composed of two major elements: a set of materials – the instruments – and an elaborate teaching system based on mediated learning experience". FIE materials are organized into instruments that are manifested in paper-and-pencil tasks. As an explanation, "exercises such as Organization of Dots, Orientation in space, Analytical Perception, Comparisons, and Categorization are 5 the principle tasks mediator and learner collaborate to perform" (Poehner, 2008, p. 62).

Concerning the third point of view, that is, MLE as a basis for designing a lesson plan and operationalizing MLE principles throughout the lesson plan, Tan (2003) presented a mathematics classroom scenario in which MLE parameters are manifested and applied. As such, Tan summarizes this observation of pedagogy in a primary math class at a table and displays how Miss Chen epitomizes MLE in her class. Simply put, the lesson plan has been broken into five stages and each stage has been meticulously illustrated. The teacher (mediator) reexamines her role and takes the role of facilitator and tries to develop a quality interaction with her students (mediatees). The different MLE criteria are expressed in this interaction. Purposefulness, meaningfulness, and transfer of learning are the essence of this MLE-based lesson plan, and goal-oriented behavior, sense of competence, and self-control are the corollaries of the MLE repertoire.

In a similar study, Kit and Chng (2016) tried to operationalize MLE parameters in a counseling situation for Gary, a 10-year-old boy as a Client-as-Learner (CAL) who was referred to a Counselor-as-Mediator (CAM) for a counseling process after he fought with another boy. As an explanation, CAM tried to help the CAL to acquire social-emotional competencies for solving interpersonal problems and to think about how he learns in the situation by supporting his self-regulation in both cognitive and emotional thinking via providing stimulating questions and providing responses cognizant to the mediational principles through an MLE-based counseling scenario. In the process of mediation, the CAM succeeded to build an emotional bond with the CAL to influence him to accept mediation and to achieve behavioral change objectives. What is prominent in this MLE-based counseling interaction is operationalizing MLE criteria one by one encapsulated in a table which is so efficient and operational to design an MLE-based course syllabus and lesson plan at least for the researcher.

Simply put, if the researcher considered MLE as a dynamic assessment methodology and tried to probe the impact of dynamic assessment on metacognitive strategy use and language skills or components, there would be some closely related pieces of research that could be traced to compare the findings (Birjandi et al., 2013; Khodabakhsh et al., 2018; Navarro & Lara, 2017; Weisgerber, 2015). But to the best of the researcher's knowledge, almost no research investigated the impact of an MLE-based lesson plan and syllabus design on the enhancement of metacognitive strategy use and the improvement of language skills or components. This research gap would be a sound rationale for the researchers to conduct this study to investigate the effect of Mediated Learning Experience through mediational behaviors by designing an MLE-based syllabus on metacognitive strategy use and grammar knowledge improvement. To this end, the study posed the following research questions:

RQ1. *Does MLE done through mediational behaviors have any significant effect on EFL learners' use of goal-setting metacognitive strategies?*

RQ2. *Does MLE done through mediational behaviors have any significant effect on EFL learners' use of planning metacognitive strategies?*

RQ3. *Does MLE done through mediational behaviors have any significant effect on EFL learners' use of assessment metacognitive strategies?*

RQ4. *Does MLE done through mediational behaviors have any significant effect on EFL learners' overall use of metacognitive strategies?*

RQ5. *Does MLE done through mediational behaviors have any significant effect on EFL learners' grammar knowledge?*

METHODS

Design of the Study

Participants

Participants of the present study were 60 Iranian elementary EFL learners, who were selected through convenience sampling. They were all native speakers of Persian, female, and ranging in age from 14 to 17 who were studying at the Municipal Educational Complex (Cultural Center) in Tehran. The participants were selected based on administering the Oxford Placement Test (OPT; 2001) for homogenizing. As an explanation, 90 students sat for the Oxford Placement Test, but just those students whose scores were between 18 and 29 were assigned as elementary EFL learners based on the OPT score guideline. They were divided into two groups of 30 learners each, i.e., the experimental group and the control group.

Instruments and Materials

Oxford Placement Test (OPT)

To ensure the homogeneity of the participants of this study, the Oxford Placement Test (OPT; 2001, version 2) with 60 items was administered among a pool of 90 learners. Only 60 students who scored 18-29 were assigned as elementary (A2 in CEFR) EFL learners and participated in this study. The reliability index for the OPT reached .87 using KR-21 method.

Grammar Materials

The course book was "Basic Oxford Practice Grammar" by Coe, Harrison, and Paterson (2006) which is written for elementary to pre-intermediate students of English. The book is divided into units, each of which covers an important grammar topic. Each unit starts with an explanation of the grammar and this is followed by a set of practice exercises. The book contains short explanations, practice activities, progress tests, and revision units. The first two parts of the book (units one to sixteen) teach tenses. As an explanation, units one to eight teach present tense, and units nine to sixteen teach past tense. These first sixteen units were taught in this course. Supplementary materials were review exercises available at teaching resources and practice exercises, read and write exercises, and tests available at learning resources downloaded at Oxford Practice Grammar Teacher's Site via joining the researcher in the Oxford Teacher's Club.

Grammar Test

The Grammar test was administered to both experimental and control groups of the study as a pre-test and post-test. As an explanation, the test downloaded at Oxford University Press.Com consisted of two parts, i.e., present-tense test and past-tense test, 30 items each. As an illustration, the researcher joined the Oxford Teachers' Club and accessed plenty of teaching resources and learning resources in respect of the Basic Oxford Practice Grammar book via searching the Oxford Practice Grammar Teacher's Site. The present-tense test contains two sections: constructed-response tasks and selected-response ones, 15 items each. The past-tense test consists of the same two parts, likewise. The reliability index for the present-tense grammar test and past-tense grammar test turned out to be .82 and .80 respectively through KR-21 Method.

Metacognitive Strategies Questionnaire by Item Types (MSQIT)

Metacognitive Strategies Questionnaire by Item Types developed and validated by Purpura (1999) was translated and validated for this study by administering it to 55 language learners other than the students who participated in the main study. As an explanation, the Persian version contains 40 items like the English version and consists of three sections: goal-setting processes, planning processes, and assessment processes. After being translated into Persian, it was checked by two experts for its validity and was piloted for its reliability estimates. Internal reliability by computing Cronbach's alpha yielded an alpha of .86 in the pilot study and .88 in the main study. The Persian version was administered to both experimental and control groups at the pre-test and post-test to probe if the participants' use of metacognitive strategies would change over the intervention.

Procedure

At the beginning of the study, the Oxford Placement Test (OPT; 2001, version 2) was implemented to homogenize the participants and only 60 students from a pool of 90 learners who scored 18-29 were assigned as elementary EFL learners based on the OPT score guideline. Then, for determining the grammar knowledge of both groups, a grammar pre-test downloaded at Oxford University Press.Com was administered to both groups, including the present-tense test and the past-tense test, 30 items each. Furthermore, the Persian version of Metacognitive Strategies Questionnaire by Item Types (MSQIT) by Purpura (1999), translated and validated in this study, was administered to both groups as the pre-test.

Both experimental and control group participants attended the grammar course at the municipal educational complex (cultural center). Grammar materials were the same for both groups; i.e., the first sixteen units of "Basic Oxford Practice Grammar" by Coe, Harrison, and Paterson (2006) teaching present tense and past tense accompanying review exercises, read and write exercises and tests downloaded at Oxford Practice Grammar Teacher's Site via joining the researcher in the Oxford Teacher's Club. The course lasted 15 sessions of 90 minutes each for both groups. They have taught the same grammar material, but mediated learning experience was adopted through mediational behaviors for the experimental group participants. As an explanation, MLE principles were activated by the teacher as a mediator in the experimental group, and the mediator-learner model was executed rather than the teacher-learner one. In a nutshell, an MLE-based lesson plan was designed for each lesson for the experimental group, the traditional lesson plan was administered for the control group, instead.

For designing an MLE-based lesson plan, an MLE Taxonomy, i.e., a meticulous and elaborate analysis of MLE principles was prepared by the researcher (Hadidi Zavareh et al., 2023). As a matter of fact, for designing this MLE Taxonomy and preparing an MLE-based course syllabus and lesson plan for each lesson the researcher has contacted Tan Oon Seng, the director of National Institute of Education at Nanyang Technological University of Singapore who is working with his students on MLE in different contexts and has been joined National Institute of Education, an institute of Nanyang Technological University and accessing different books and articles in respect of MLE via NIE Digital Repository. As an illustration, the MLE-based lesson plan was prepared according to their guidelines with some modifications to tailor the syllabus to cater to the needs of the local learners. Each lesson plan was checked by two specialists and lesson plans were revised slightly throughout the course lesson by lesson. One classroom scenario, i.e., an MLE-based lesson plan concerning present continuous, summarizing how the researcher epitomizes MLE in her class, is elaborated in an in-press article (Hadidi Zavareh et al., in press). For the ensuing discussion, the lesson has been broken into four stages. A summary of these four stages is presented in the four succeeding paragraphs.

In stage 1 the teacher announces to the class the overall purpose of the grammar lesson (Intentionality). The students show a sense of excitement and expectation and desire to interact with the teacher and their peers (Reciprocity) by the teacher's substituting or modifying stimuli (Intentionality). Moreover, the entire learning environment is designed meticulously and purposefully toward goal setting atmosphere by the teacher as a mediator (Goal-seeking and goal-setting behavior). In addition, the teacher affirms the students' curiosity and expectations (Feeling of competence).

By stage 2 the mediator elaborates on the importance of the grammar lesson (Use-1: actions and situations in progress now) and the reason for emphasizing it by providing meaningful contexts and schema building (Meaning). Furthermore, the teacher regulates the students' responses to a grammar task by either inhibiting impulsivity or accelerating the reaction (Reflective practice). The students' efforts for task completion or answering the questions in the chorus are acknowledged by the mediator (Feeling of competence). Likewise, the researcher pursues the learning objectives patiently by designing suitable grammar tasks and

activities (Goal-planning and goal-achieving behavior). Equally important, the mediator puts the students in pairs and groups to complete the tasks (Interdependency and sharing). In addition, the teacher designs different tasks and activities for the same grammar lesson to prepare the students to confront the novel and challenging situations and be familiar with various uses of the grammar lesson (Novelty and complexity).

At stage 3 the teacher explains the value of the grammar lesson (Use-2: actions and situations around now, but not exactly now) and the reason for focusing on it by presenting stimuli with importance, value, and worth not presented with a neutral approach (Meaning). In addition, the mediator controls the students' answers to a grammar task by directly intervening to guide the responses of the students in the desired direction (Reflective practice). Equally important, the researcher expresses regular affirmation as students respond (Feeling of competence). Furthermore, the teacher proceeds with the goal-directed teaching behaviors concerning the grammar lesson objectives (Goal-planning and goal-achieving behavior). Besides, the students are allowed to compare their answers with a partner before checking the answers with the whole class (Interdependency and sharing). Moreover, the grammar lesson is imbued with creativity and novelty by presenting various tasks and activities. As an explanation, the teacher paves the way for the students to confront novel situations and tasks (Novelty and complexity).

In stage 4 the mediator tries to personalize and localize the grammar tasks by getting the students to do grammar tasks beyond the scope of the immediate grammar lesson (Transcendence). Moreover, the mediator goes around the class and gives support, affirmation, and guidance (Feeling of competence). Furthermore, the researcher gets the students to read each other works and writings (Interdependency and sharing). likewise, the mediator maneuvers to provide help to students in analyzing the task components and arousing awareness of task characteristics and suitable responses (Reflective practice).

After administering MLE-based lesson plans in the experimental group while executing traditional lesson plans for the control group which lasted 15 sessions, the grammar test containing the present-tense test and the past-tense test, and the Persian version of Metacognitive Strategy Questionnaire by Item Types (MSQIT) were administered to both groups at the end of the course as the post-test.

Data Analysis

The collected data was analyzed by Statistical Package for the Social Sciences (SPSS) software version 28 through MANCOVA to investigate the first four research questions, i.e., the effect of MLE done through mediational behaviors on the learners' use of goal-setting, planning, assessment strategies and the learners' use of metacognitive strategy as a total and ANCOVA to examine the fifth research question, that is, the impact of MLE done through mediational behaviors on the learners' grammar knowledge improvement. To develop an MLE-based grammar course, an MLE-oriented lesson plan was designed for each grammar lesson delicately and meticulously. Each one was checked by two experts and was developed following the guidelines of the Singaporean Mediated Learning Lab specialists and was tailored throughout the course lesson by lesson to cater to the needs of the local learners.

RESULTS

The first, second, third, and fourth research questions of this study inquired if MLE done through mediational behaviors has any significant effect on EFL learners' use of goal setting, planning, assessment, and overall use of metacognitive strategies. To investigate these four research questions of the study, multivariate ANCOVA (MANCOVA) was utilized. As a matter of fact, Pallant (2013) maintains that multivariate analysis of covariance (MANCOVA) is a statistical technique that is the extension of the analysis of covariance (ANCOVA). In fact, it is the multivariate analysis of variance (MANOVA) with a covariate(s). In MANCOVA, we measure for statistical differences on multiple continuous

dependent variables (post-test scores gained on different types of metacognitive strategies i.e., goal setting, planning, assessment, and total) by an independent grouping variable (MLE done through mediational behaviors), while controlling for a third variable called the covariate (pre-test scores acquired on goal setting, planning, assessment, and overall use of metacognitive strategies). Covariates are added to reduce error terms so that the analysis eliminates the covariates' effect on the relationship between the independent grouping variable and the continuous dependent variables.

The descriptive statistics for the pre-test of four types of metacognitive strategies in the experimental and control groups were calculated before presenting the results of MANOVA (Table 1). As demonstrated in Table 1 and Figure 1, the means for the four types of metacognitive strategies in the experimental and control groups seem to be close to each other on the pre-test.

Table 1

Descriptive Statistics for Scores Gained on Four Types of Metacognitive Strategies by Group (Pre-test)

Variable	Group	N	Mean	SD	SEM
Goal setting	Experimental	30	19.10	3.021	.552
	Control	30	18.63	3.264	.596
Planning	Experimental	30	27.40	3.420	.624
	Control	30	26.57	3.298	.602
Assessment	Experimental	30	83.90	4.574	.835
	Control	30	82.30	5.052	.922
TOTAL	Experimental	30	130.40	10.264	1.874
	Control	30	127.50	10.061	1.837

Table 2 below includes the descriptive statistics for the post-test scores obtained on four types of metacognitive strategies in the experimental and control groups.

Table 2

Descriptive Statistics for Scores Gained on Four Types of Metacognitive Strategies by Group (Post-test)

Variable	Group	N	Mean	SD	SEM
Goal setting	Experimental	30	19.70	2.996	.547
	Control	30	18.97	3.222	.588
Planning	Experimental	30	29.17	3.544	.647
	Control	30	26.93	3.393	.619
Assessment	Experimental	30	85.27	4.705	.859
	Control	30	83.10	5.287	.965
TOTAL	Experimental	30	134.13	9.634	1.759
	Control	30	129.00	9.692	1.769

As shown in Table 2 and Figure1, the mean score for the two types of metacognitive strategies i.e., 'planning' and 'total', in the experimental group, is noticeably greater than the control group but not for the other type i.e., 'goal setting' and 'assessment'.

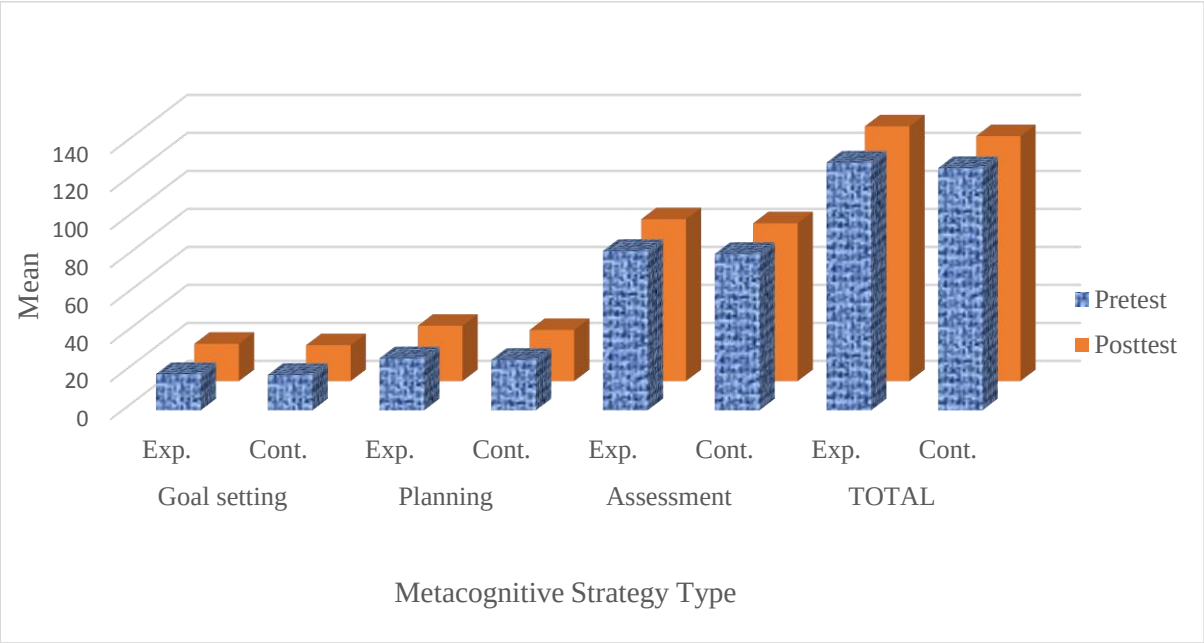

Figure 1

Bar graph of mean scores gained on four types of metacognitive strategies by group (pre-test & post-test)

According to Field (2009), three assumptions (interval data, independence of subjects, homogeneity of variances) should be checked before one decides to perform parametric statistical tests. In the present study, the first assumption is not violated as the present data are measured on an interval scale. Moreover, Bachman (2005, p. 236) states that the assumption of independence of subjects is met when "the performance of any given individual is independent of the performance of other individuals" and in fact, it was the case in this research. Also, the results of the homogeneity of variances are summarized in Table 3. Table 3 shows the significant value associated with Levene's test for the three types of metacognitive strategies i.e., 'goal setting' ($p = .86$), 'assessment' ($p = .66$), and 'total' ($p = .16$), is larger than the selected significant level ($p > .05$), so homogeneity of variances was not violated for these three variables, but this assumption was not met for 'planning' ($p = .01$, $p < .05$). To compensate for this shortcoming, the significance level was decreased to .01 to analyze the data for 'planning' answering the second research question.

Table 3

Levene's Test of Equality of Error Variances for Scores Gained on Three Types of Learners' Metacognitive Strategies

Variable	F	df1	df2	Sig.
Goal setting	.029	1	58	.864
Planning	6.806	1	58	.012
Assessment	.197	1	58	.659
TOTAL	2.041	1	58	.159

As evident from Table 4, the assumption of homogeneity of covariance was not violated (Box's $M = 16.23$, $F = 1.44$, $p = .16$, $p > .05$). Since the majority of them met the homogeneity of variances assumption in addition to enjoying the assumption of the equality of covariance matrices discussed in the next section, the current researcher decided to the homogeneity of variance assumption was not violated.

Table 4
Box's Test of Equality of Covariance Matrices for Types of Metacognitive Strategies

Box's M	F	df1	df2	Sig.
16.233	1.437	10	6903.586	.157

As observable from Table 5, multivariate tests indicated that there was a statistically significant difference (Wilks' Lambda = .81; $F_{(3, 53)} = 3.97$; $p = .008$, $p < .05$) in the learners' metacognitive strategies measures between the two groups on the post-test while controlling the effect of the pre-test. The results showed that Partial η2 was .18 reflecting a moderate effect size based on Cohen's guidelines (1988, pp. 284-7).

Table 5
Multivariate Tests for Metacognitive Strategies

	Effect	Value	*F*	Hypothesis df	Error df	Sig.	Partial Eta Squared
Intercept	Pillai's Trace	.035	.644b	3.000	53.000	.590	.035
	Wilks' Lambda	.965	.644b	3.000	53.000	.590	.035
	Hotelling's Trace	.036	.644b	3.000	53.000	.590	.035
	Roy's Largest Root	.036	.644b	3.000	53.000	.590	.035
Group	Pillai's Trace	.184	3.971	3.000	53.000	.008	.184
	Wilks' Lambda	.816	3.971	3.000	53.000	.008	.184
	Hotelling's Trace	.225	3.971	3.000	53.000	.008	.184
	Roy's Largest Root	.225	3.971	3.000	53.000	.008	.184

However, multivariate tests do not specify the precise place of difference between the two groups in terms of the four types of learners' metacognitive strategies. Therefore, tests of between-subjects effects were run (Table 6). As represented in Table 6, tests of between-subjects effects failed to find any significant difference in 'goal setting' post-test scores between the experimental and control groups ($F_{(1, 55)} = .73$, $p = .39$, $p > .05$, $\eta 2 = .01$). Accordingly, the answer to the first research question of this study was negative. In fact, it was shown that MLE-based grammar course does not influence EFL learners' use of goal-setting metacognitive strategies. But, Table 6 indicates that tests of between-subjects effects detected a significant difference in 'planning' post-test scores between the experimental and control groups ($F_{(1, 55)} = 8.73$, $p = .005$, $p < .01$, $\eta 2 = .14$). Therefore, the current researcher could answer the second research question positively. In other words, it was found that MLE done through mediational behaviors affects EFL learners' use of planning metacognitive strategies.

As seen in Table 6, tests of between-subjects effects did not find any significant difference in 'assessment' post-test scores between the experimental and control groups ($F_{(1, 55)} = 1.34$, $p = .25$, $p > .05$, $\eta 2 = .03$). Thus, the answer to the third research question of this study was negative. In other words, it was shown that MLE done through mediational behaviors does not improve EFL learners' use of assessment metacognitive strategies. On the whole, as it is observable from Table 6, tests of between-subjects effects indicated that there was a significant difference in 'total' metacognitive strategies post-test scores between the experimental and control groups ($F_{(1, 55)} = 10.85$, $p = .002$, $p < .05$, $\eta 2 = .16$). As a result, the researcher could answer the fourth research question positively. It means it was found that MLE done through mediational behaviors influences EFL learners' use of total metacognitive strategies.

Table 6
Tests of Between-Subjects Effects for Different Types of Metacognitive Strategies

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	Post-Goal setting	484.346	4	121.086	78.361	.000	.851
	Post-Planning	548.805	4	137.201	33.681	.000	.710
	Post-Assessment	1287.137	4	321.784	75.041	.000	.845
	Post-TOTAL	5359.770	4	1339.942	163.421	.000	.922
Group	Post-Goal setting	1.131	1	1.131	.732	.395	.013
	Post-Planning	35.561	1	35.561	8.730	.005	.137
	Post-Assessment	5.779	1	5.779	1.345	.251	.026
	Post-Total	88.943	1	88.943	10.848	.002	.165
Error	Post-Goal setting	84.988	55	1.545			
	Post-Planning	224.045	55	4.074			
	Post-Assessment	235.846	55	4.288			
	Post-TOTAL	450.964	55	8.199			
Total	Post-Goal setting	22996.000	60				
	Post-Planning	47981.000	60				
	Post-Assessment	426733.000	60				
	Post-TOTAL	1044398.000	60				

The fifth research question of the present study sought to see if MLE done through mediational behaviors has a significant effect on elementary EFL learners' grammar knowledge. Analysis of Covariance was used to examine this research question.

According to Hatch and Lazaraton (1991), the assumptions of linearity, homogeneity of variances, and homogeneity of regression slopes must be checked before performing ANCOVA. The results of checking the assumption of linear relationship between the dependent variable (post-test of grammar knowledge) and the covariates (pre-test of grammar knowledge) are displayed in Figure 2. As shown in the scatter plot, there are two straight lines between the pre-test (covariate) and post-test scores representing the two groups of the study. These straight lines indicate that the linearity assumption was not violated.

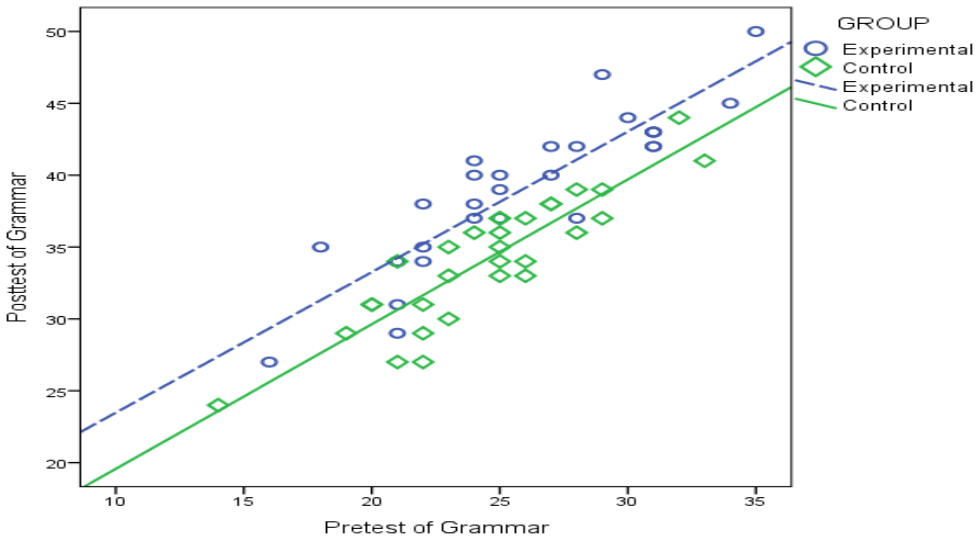

Figure 2
Scatter plot for grammar knowledge scores in the two groups (pre-test & post-test)

Table 7

Levene's Test of Equality of Error Variances for Grammar Knowledge Scores by Group

Levene Statistic	df1	df2	Sig.
.095	1	58	.759

The third assumption relates to the homogeneity of regression slopes. As outlined in Table 8 below, the results indicated that the significance level of the interaction (GROUP * PRE-TEST) between group and the pre-test of total grammar knowledge was above .05 ($F_{(1, 56)} = .04$, $p = .83$) and therefore not statistically significant. That means the conclusion that the pre-test and post-test of grammar knowledge scores in the two groups enjoyed the assumption of homogeneity of regression slopes.

Table 8

Homogeneity Test of Regression Slopes for the Effect of MLE-based Grammar Course on Grammar Knowledge

Source	Type III Sum of Squares	*Df*	Mean Square	*F*	Sig.	Partial Eta Squared
Corrected Model	1397.142	3	465.714	91.898	.000	.831
Intercept	222.989	1	222.989	44.002	.000	.440
GROUP * PRE-TEST	.221	1	.221	.044	.835	.001
Error	283.792	56	5.068			
Total	81470.000	60				
Corrected Total	1680.933	59				

As all assumptions were met, one-way ANCOVA was decided to be applied to compare the effectiveness of the MLE-based grammar course on elementary EFL learners' grammar knowledge. The independent variable is type of teaching grammar knowledge (Group), and the dependent variable is grammar knowledge. Participants' scores on the pre-test of grammar knowledge are used as the covariate in this analysis.

The number of students, mean, standard deviation, and standard error of means for the scores in the experimental and control groups were calculated (Table 9) before explaining the results of ANCOVA. Table 4.3 shows that the mean of grammar knowledge in the experimental group ($M = 25.63$, $SD = 4.76$) and control group ($M = 24.50$, $SD = 3.92$) are close to each other on the pre-test; however, the mean of grammar knowledge in the experimental group ($M = 38.77$, $SD = 5.22$) is much higher than the mean in the control group ($M = 34.17$, $SD = 4.45$) on the post-test.

Table 9

Descriptive Statistics of Grammar Knowledge Scores on Pre-test and Post-test by Group

Test	Group	N	Mean	SD	SEM
Pre-test	Experimental	30	25.63	4.760	.869
	Control	30	24.50	3.919	.716
Post-test	Experimental	30	38.77	5.217	.953
	Control	30	34.17	4.450	.812

To depict the results of both the pre-test and post-test for both groups in terms of grammar knowledge, a Line Chart (Figure 3) was made. As it's observable from the Line Chart, the means of grammar knowledge in the experimental and control groups are almost at the same level on the pre-test, still, on the post-test, the mean for the control group is considerably higher than the experimental group

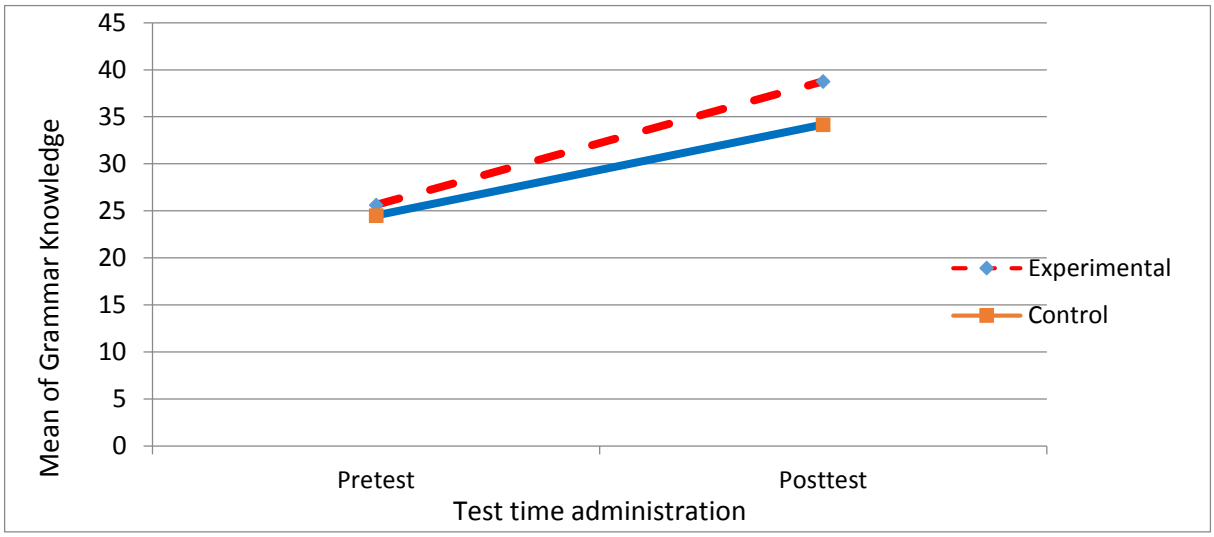

Figure 3
Line chart for two groups' means of grammar knowledge (pre-test & post-test)

Table 10 summarizes the results of ANCOVA. After adjusting for the grammar knowledge scores on the pre-test, there was a significant difference between the two groups' grammar knowledge scores on the post-test, $F_{(1, 57)} = 35.80$, $p = .000$, partial eta squared = .38; as a result, the fifth null hypothesis of this study that states: "MLE done through mediational behaviors does not have any significant effect on elementary EFL learners' grammar knowledge" was rejected. Therefore, it can be claimed that MLE done through mediational behaviors improves elementary EFL learners' grammar knowledge.

Table 10
ANCOVA: Tests of Between-Subjects Effects of MLE done through mediational behaviors on Grammar Knowledge

Source	Type III Sum of Squares	*Df*	Mean Square	*F*	Sig.	Partial Eta Squared
Corrected Model	1396.921	2	698.460	140.178	.000	.831
Intercept	231.856	1	231.856	46.532	.000	.449
Pre-test	1079.521	1	1079.521	216.655	.000	.792
GROUP	178.384	1	178.384	35.801	.000	.386
Error	284.013	57	4.983			
Total	81470.000	60				
Corrected Total	1680.933	59				

Moreover, as evident from Table 10, there was seen a strong relationship between the pre-intervention and post-intervention scores on the total grammar knowledge, as shown by a *p*-value of .000, $F_{(1, 57)} = 216.65$. That means the grammar knowledge scores gained on the pre-test affected the grammar knowledge scores gained on the post-test. Additionally, Table 10 shows that the partial eta squared (effect size) value is .79.

DISCUSSION

The first four research questions of the present study investigated the mediated learning's effectiveness through mediational behaviors in improving the EFL learners' use of goal setting, planning, assessment, and overall use of metacognitive strategies. The fifth research question inquired if Mediated Learning Experience approach done through mediational behaviors enhances the EFL learners' grammar knowledge.

Regarding the first four research questions, the first one addressed the effect of Mediated Learning Experience done through mediational behaviors on the EFL learners' use of goalsetting metacognitive strategies. The results indicated

that there was not any significant difference between experimental and control groups regarding the use of goalsetting metacognitive strategies ($p = .39$, $p > .05$). The second research question investigated the mediated learning's effectiveness on the learners' use of planning metacognitive strategies through mediational behaviors. As a result, the experimental group outperformed the control group in respect of the use of planning metacognitive strategies ($p = .005$, $p < .01$). Thirdly, this research studied the effect of mediational behaviors on the learners' use of assessment metacognitive strategies. The results did not show any significant difference between the experimental and control groups' use of assessment processes ($p = .25$, $p > .05$). In respect of the fourth research question, the experimental group excelled over the control group regarding the use of metacognitive strategies as a total ($p = .002$, $p < .05$).

To the best of the present researchers' knowledge, almost no research has examined the effectiveness of Mediated Learning Experience as a basis for designing a lesson plan, i.e., an MLE-based syllabus (the new angle), on the learners' use of metacognitive strategies. So, there are scant similar studies in this regard, which might serve as a reference benchmark to be compared with the present research. Nevertheless, the researchers try to verify and give relevant justifications pertinent to the findings of the study in the following paragraphs.

To illustrate the first and second research questions concerning planning and goal-setting processes, it is better to elaborate on the eighth principle of MLE, i.e., goal-seeking, goal-setting, goal-planning, and goal-achieving behavior first. As an explanation, goal-setting metacognitive strategies are seemingly consistent with goal-seeking and goal-setting behavior, the first two phrases of the MLE eighth parameter which is defined by Poehner (2008, p. 58) as "proposing and perceiving goals". Moreover, planning strategies are in line with goal-planning and goal-achieving behavior, the second two phrases of principle eight of MLE, explained by Poehner (2008, p. 58) "planning specific actions, including the achievement of subgoals that will lead to task completion". In other words, MLE's principle eight encompasses both goal-setting and planning metacognitive strategies in nature. So it is expected both the first and second research questions are answered positively in this study but this is not the case for the first research question. The researcher tries to verify this issue in the two succeeding paragraphs.

Bachman and Palmer (1996, p. 71) define the goal-setting component as "deciding what one is going to do", and the planning component as "deciding how to use what one has", instead. Likewise, they clarify goal-setting strategies as "identifying the test tasks, choosing one or more tasks from a set of possible tasks, and deciding whether or not to attempt to complete the task(s) selected". On the other hand, the planning component is explained by them as selecting and formulating one or more plans for implementing elements from the areas of topical knowledge and language knowledge for completing the test task. Seng et al. (1993) describe goal-setting strategies as stating a goal, selecting operations to perform, and sequencing operations. But they elucidate the planning component as keeping the goal in mind, knowing when a subgoal has been achieved, deciding when to go to the next operation, and selecting the next appropriate operation. In conclusion, goal-setting strategies imply setting different goals and selecting operations to perform, while planning strategies entail utilizing different types of plans for achieving the goal and implementing or executing the goal.

In this study which is an MLE-based syllabus performed by designing an MLE-based lesson plan for each lesson, the researcher tries to implement the goal-seeking and -setting principle of MLE just by creating a goal-setting atmosphere by preparing the class environment purposefully beforehand. But to operationalize the goal-planning and -achieving parameter of MLE, she pursues learning objectives patiently through goal-directed teaching behaviors or designing suitable grammar tasks and activities and getting students to do them permanently. As an illustration, the researcher's focus is on the mediation of goal-planning behavior more than goal-setting. Consequently, the students learn to use planning metacognitive strategies by experiencing these goal-oriented activities

throughout the course. They learn to concentrate to achieve the goal, to take into account the purpose of tasks and activities, and to examine the available resources for reaching the goal and recovering from errors, and overcoming obstacles. So, the experimental group learners excel over the control group ones concerning planning processes but not in respect of the goal-setting ones.

In respect of the third research question, i.e., assessment metacognitive strategies, some reasons and justifications are presented here to verify the negative answer to the question. Assessment processes can be considered to be consistent with the fifth principle of MLE in nature, which is mediation of reflective practice. As an explanation, Isman and Tzuriel (2008) define mediation of reflective practice which they named mediation of control of behavior as regulating a child's reaction either by reducing impulsivity or accelerating the child's behavior through modeling of self-control or analyzing the task components.

Regarding assessment metacognitive strategies, Bachman and Palmer (1996, p. 71) explain assessment as "taking stock of what is needed, what one has to work with, how well one has done" which is rather related to self-evaluation and self-control. So it is expected that experimental group learners excel over the control group ones regarding assessment metacognitive strategies but this is not the case. It could be justified due to the researcher's implementation of reflective practice just by posing questions during presenting the grammar lesson and doing the grammar task and peer assessment. It seems that if the researcher got the students to write a reflective journal at the end of each session or used a video-stimulated recall instrument to emerge or stimulate learners' self-evaluation strategies, the experimental group would outperform the control one concerning assessment processes. In the present study, however, due to a large number of participants utilizing these two instruments was not possible.

Concerning the fourth research question, the ultimate goal of Mediated Learning Experience approach is to help students learn how to learn and to be independent and autonomous thinkers and learners by involving and enhancing the learners' cognitive functioning and thinking process (Feuerstein, 2000). In fact, through the use of the MLE model teachers convert into great learning coaches and stimulate students to learn to think and think to learn. On the other hand, metacognition is called "thinking about thinking" (Anderson, 2002). Put another way, metacognition makes your thinking visible and results in critical reflection on your thinking process and specific changes in how you learn. Supposedly, "Metacognitive strategies are crucial because they oversee, regulate, or direct the language learning task, and involve thinking about the learning process" (Vandergrift, 2002, p. 559).

In a nutshell, the essence of Mediated Learning Experience Approach is in line with metacognition and the ultimate goal of MLE is to stimulate students to learn how to learn. Excelling the experimental group over the control group in this study indicates that the researcher has successfully performed the MLE approach in her class by designing an MLE-based lesson plan for each lesson. In conclusion, Mediated Learning Experience approach done through mediational behaviors affects the use of metacognitive strategies as a total significantly. In other words, the experimental group outperformed the control one in respect of the overall use of metacognitive strategies.

The fifth research question, exploring the effect of Mediated Learning Experience done through mediational behaviors on the EFL learners' grammar knowledge is answered positively in this study. In other words, an MLE-based grammar course improves elementary EFL learners' grammar knowledge. Given the novelty of the issue, studies that approach the MLE theory as a basis for designing a course and developing a lesson plan, and probing the effect of an MLE-based course on language skills or components are rare, if not lacking, to the best of the researchers' knowledge. It is not an exaggerated expression if the researchers claim that no closely related study could be traced to compare the results at least within the ELT domain. Fortunately, there are few studies in other disciplines such as Mathematics and Biology.

As an explanation, Tan (2016) developed an "MLE Mathematics lesson plan" (p. 54-56) for her study and compared a non-MLE Math lesson with an MLE Math one. She posited that learning Mathematics would be a key fundamental in a technology- and innovative-driven century to nurture a well-educated and highly-skilled generation who would think critically, abstractly, and logically with a positive attitude towards their level of mastery. As such, she applied Mediated Learning Experience in her class by developing an MLE-based Math lesson plan to instill a love for Mathematics in the students. In a nutshell, she postulated in a concluding sentence, "Not only does MLE steer the direction of the classroom discourse, but it also facilitates and develops cognitive functions of students through the use of the content" (Tan, 2016, p. 60).

Another study conducted by Ping (2016) attempted to implement MLE in her secondary Biology classroom to investigate the effectiveness of MLE in improving the learners' cognitive functions and bridging their cognitive deficiencies in the learning of the concept of the working of the heart and blood flow. In an MLE classroom, the mediator asked for utilizing Biological terms and observations from the learners on a human heart diagram, in a non-MLE classroom, the teacher usually tells the learners the names of the various parts of the human heart, instead. As such, the MLE facilitator tried to implement the MLE principles in her classroom, design the proper MLE interactions pertinent to the topic, and develop MLE-based learning resources for her teaching. The results showed that the MLE group outperformed the control group in the post-test. Moreover, using MLE-based learning resources, implementing MLE principles, and using MLE interactions in her classroom resulted in an improvement in the students passing science (Physics/Biology) from 50% to 80% within a year.

CONCLUSION

The results of the study indicated that the learners' use of planning strategies improved after the intervention, that is, an MLE-based lesson plan done through mediational behaviors, but their use of goal-setting and assessment strategies did not change significantly. Moreover, the findings revealed the enhancement of the learners' use of metacognitive strategies as a total and their grammar knowledge after the treatment.

Metacognition is deeply embedded in the spirit of Mediated Learning Experience approach. As an explanation, the ultimate goal of mediational interactions of Mediated Learning Experience is stimulating the learner to be an autonomous thinker and to learn how to learn. In this regard, Seng et al. (1993, p. 5) state "One important aspect of metacognition and meta-learning is that they develop primarily through social interaction with adults and other children". In other words, mediational behaviors experienced by the learners in the Mediated Learning Experience atmosphere are so beneficial in encouraging them to use metacognitive strategies. Briefly then, the experimental group of this study who experienced the mediational behaviors via an MLE-based syllabus outperformed the control group in respect of using metacognitive strategies as a total entitled as the research question four.

Regarding goal-setting and planning strategies, although they are in line with principle eight of MLE and positive answers to their related research questions are expected, the results show a positive answer to the planning-related research question and a negative answer to the research question pertinent to the goal-setting component. As an explanation, the focus of this study is more on operationalizing the goal-planning and goal-achieving principle of MLE than goal-setting and -seeking behavior. As a result, the students learn to use planning strategies due to experiencing goal-oriented teaching behaviors throughout the course rather than goal-setting strategies which are related to stating a goal and selecting operations to perform. In a nutshell, the experimental group excelled over the control group in respect of planning strategies, but not regarding goal-setting ones.

Concerning Assessment metacognitive strategies, it is expected that the experimental group outperformed the control one because the assessment component can be regarded as in line with principle five of MLE in nature, i.e., mediation of reflective practice, but this is not the case. This issue may be verified by the

way of implementation of the fifth principle of MLE in this study. It seems that more robust techniques such as a reflective journal or a video-stimulated recall could stimulate the learners' significant use of the assessment strategies but the class's large size hindered the researcher to utilize proper techniques.

In respect of grammar knowledge, the experimental group revealed an improvement in grammar knowledge in comparison with the control group. Although it would be claimed that no other studies have been done at least in the ELT domain to be a benchmark for comparing the results, studies in other disciplines such as biology and mathematics showed the participants' significant change after the treatment.

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Biodata

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