

An Exploration of EFL Learners' Declarative Knowledge, Procedural Knowledge, and Monitoring

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Abstract – This study is an attempt to investigate the relationship between EFL learners' declarative and procedural knowledge, monitoring, and language achievement. For this purpose, three areas had been examined in a single study. First it probed the learners' knowledge of cognition (declarative knowledge and procedural knowledge) and its relationship to their achievement. Furthermore, it investigated the relationship of regulation of cognition (monitoring) and learners' achievement. And finally, it examined if there was any relationship between knowledge of cognition and regulation of cognition. To conduct this study, The English version of the Metacognitive Awareness Inventory (MAI) questionnaire that was constructed by Schraw and Dennison (1994) was administered. The GPAs of the participants were also obtained. The results indicated that there were significant correlations between declarative knowledge and achievement as well as between monitoring and achievement. No significant correlation was observed between procedural knowledge and language achievement. Significant associations were obtained between monitoring and declarative and procedural knowledge.

Keywords: Declarative knowledge, Procedural knowledge, Monitoring, Achievement.

1. INTRODUCTION

These days, college professors are encountered with classrooms occupied with students with different levels of knowledge and distinctive styles of learning. Students can be classified into three classes according to their knowledge. Some students are dynamic autodidacts who manage their own process of learning, know their strengths and weaknesses, and are able to apply this knowing to different learning situations. Others may be intermediate students who work and try hard and who know about their learning strengths and weaknesses like the previous group, but who are not that much able to adequately manage their learning. Still the third group may be called passive learners who know almost little or none about how they learn and how to control their learning. Above all, professors have to deal with students who have varied levels of metacognitive skills (Young & Fry, 2008).

Metacognitive awareness and self-regulation are psychological factors that cause differences in the performance of students (Baghari & Ghanizadeh, 2016). Educational psychologists considered metacognition as one of the most important tools of learning. The term metacognition was significant for couple of decades and can somehow predict academic success. (Kruger & Dunning, 1999).

Although metacognition and self-regulation are co-extensive and interlacing concepts, they are obviously independently recognizable yet cooperatively entailed both developmentally and in their functions in human ideas and behavior. (Fox & Riconscent, 2008). There are generally two components of metacognition: knowledge of cognition, and regulation of cognition (Flavell, 1979). Knowledge of cognition evaluates learners understanding of their own strengths and weaknesses, knowledge about methods and why and when to use those methods.

1.1. Metacognitive Awareness

Metacognitive knowledge is about our own cognitive processes and our knowledge about how to manage those processes to increase learning. Regulation of cognition estimates one's knowledge about planning, implementing, monitoring, and evaluating strategy use. Flavell (1979) categorized knowledge of cognition into three subgroups: person, task and strategy knowledge: Person relates to general knowledge which a person has about people's cognitive abilities. Task refers to the knowledge about the nature of the task. Ultimately, strategy implies the knowledge about strategies that may be practical for various tasks and different situations.

Metacognition includes at least three different types of metacognitive awareness when considering metacognitive knowledge (Jacobs & Paris, 1987):

1. *Declarative Knowledge*: pertains to knowledge about oneself as a learner and about the factors can affect one's performance (Schraw & Gregory, 1998). Declarative knowledge can also be called as "world knowledge"(Schneider & Artelt, 2010).
2. *Procedural Knowledge*: relates to knowledge about performing things. This type of knowledge is shown as heuristics and strategies (Schraw & Gregory, 1998). A high level of procedural knowledge can allow learners to do tasks more spontaneously. This is obtained through many different strategies that can be accessed more effectively (Pressley, Borkowski, & Schneider, 1987).
3. *Conditional knowledge*: refers to learners' knowledge about when and why to utilize declarative and procedural knowledge (Garner, 1990). It enables students to allot their resources when using those strategies. This in order permits the strategies to become more efficient (Reynolds, 1992).

Like metacognitive knowledge, metacognitive regulation or "regulation of cognition" consists of three subcategories that are fundamental (Schraw & Gregory, 1998):

1. *Planning*: relates to goal setting and suitable choosing of strategies and methods and also the accurate allocation of resources that influence task performance before engaging in learning.
2. *Monitoring*: refers to one's consciousness of understanding and task performance and the use and strategies while involving in an activity.
3. *Evaluating*: pertains to estimating the final outcome of a task and the effectiveness at which the task was done. This can include re-assessing previous strategies.

Students who demonstrate a wide range of metacognitive skills perform better on exams and complete work more efficiently. They are autodidacts who use the correct tool for their job and adapt learning strategies and skills to their awareness of effectiveness (Zafarmand, Ghanizadeh, & Akbari, 2014). And, of course, as mentioned in Ford, Smith, Weissbein, Gully, and Salas (1998) Individuals high in metacognitive awareness are skilled at monitoring and scanning their progress in the direction of their goals, identifying their strength and weakness points, and adapting their learning strategies accordingly to achieve desirable results.

1.2. Achievement

Achievement goal theory (Ames, 1992; Dweck & Legget, 1988; Nicholls, 1989) assumes that the goals that students hold for involving in a specific academic task (i.e., their achievement goals) are a significant stimulus to their achievement-related processes and products. There are three sorts of achievement goal that have been regularly studied, mastery, performance-approach, and performance-avoidance (e.g., Elliot & Church, 1997; Skaalvik, 1997). Students who choose a mastery goal concentrate on the progression of proficiency in an academic task. In opposition to the previous group, students who use a performance goal are concerned with the presentation of competence relative to others. Particularly, students high on a performance approach goal are directed to prove that they are more skilled than their peers, while students high on a performance-avoidance goal seek to keep away from social opinions that they are less skilled than their peers. Collecting proofs has displayed that the utilization of these goals is driven by contrasting antecedents and causes contrasting samples of cognitive, affective, and behavioral outcomes (Elliot, 1999).

The results in the research concerning the correlation of metacognition with academic and achievement measures reveals that when regulation of cognition is evaluated by having students assess their performance on local as well on global degree, regulation of cognition is related to test performance, domain specific GPA scores, and overall GPA scores (Schraw, 1994).

2. PURPOSE OF THE STUDY

The present research is an attempt to find answers to the following research questions:

1. Is there any significant relationship between EFL learners' declarative knowledge and language achievement?
2. Is there any significant relationship between EFL learners' procedural knowledge and language achievement?
3. Is there any significant relationship between EFL learners' monitoring and language achievement?
4. Is there any significant relationship between EFL learners' monitoring and declarative knowledge?
5. Is there any significant relationship between EFL learners' monitoring and procedural knowledge?

3. METHODOLOGY

In order to indicate the relationship between declarative and procedural knowledge, monitoring and achievement, quantitative data were collected. The data were obtained from Metacognitive Awareness Inventory questionnaire (measuring three variables in question) that included 19 items, all participants took English 6 hours a week, and the instruction took more than 6 weeks. All of the participants were asked to complete the same questionnaire and also write down their GPA to determine whether they were different in their declarative and procedural knowledge, monitoring and achievement.

3.1. Participants

The individuals participating in this study were 72 EFL learners studying English language and literature and English Language Teaching (ELT) in two universities of Gorgan, Iran (University of Golestan and Islamic Azad University of Gorgan). Their first language was Persian and they included both male and female students. The number of the female participants amounted to 49 (68 %), whereas that of the male participants corresponded to 23 (31.94 %). All of them were undergraduate students (junior and senior) from four classes aged 20-30. All of the students were unaware of Metacognitive Awareness Inventory (MAI).

3.2. Instrument

The Metacognitive Awareness Inventory (MAI) (Schraw & Dennison, 1994) was used to measure students' metacognitive awareness. Schraw and Dennison designed an inventory in order to measure metacognitive awareness. Their study was one of few studies used in measuring metacognitive awareness (Cohen, 2012). The metacognitive awareness inventory includes 52 statements investigating two categories of metacognition; knowledge of cognition and regulation of cognition with their subcomponents. Items are mixed and not divided into these categories (Schraw, 1998). All items are in five point Likert Scale, ranging from 'strongly agree', 5, to strongly disagree 1. The inventory showed a satisfactory reliability coefficient of 0.88.

Through the process of inventory development, three experiments were carried out in order to investigate these three ideas; first whether current conceptualizations of metacognition appear to be valid, the second issue was the statistical relationship between knowledge and regulation of cognition and the last one addressed the convergent validity of the instrument by comparing the relationship between knowledge and regulation of cognition (Schraw & Dennison, 1994).

In this study, items measuring declarative knowledge, procedural knowledge, and self-monitoring were extracted and administered to participants.

3.3. Procedure

3.3.1. Data Collection

As mentioned earlier, to conduct this study the English version of Metacognitive Awareness Inventory (MAI) questionnaire that was constructed by Schraw and Dennison (1994) was

administered and 72 students had 15-20 minutes to answer it but all the metacognitive and self-regulation factors included in the questionnaire were not needed for the purpose of this study and only the relevant factors were included in the final version of the modified questionnaire. First of all, the respondents were informed about the purpose of the study and were asked to write their gender. Also to determine the participants' achievement they were asked to write down their grade point average truthfully in the questionnaires handed to them. It was explained to the participants that their identities would remain anonymous and confidential so they were encouraged to answer the questions to the best of their ability. The research instrument (the questionnaire) was administered during one class session.

3.3.2. Data Analysis

After collecting all the Metacognitive Awareness Inventory (MAI) questionnaires which are in Likert format from the respondents, the total scores of each questionnaire were computed and tabulated. Besides calculating the total score of questionnaire, the points for each item of the questionnaire was also computed separately. This study is basically a quantitative type of research and in order to answer the research questions, a Pearson's Correlation Coefficient was employed to achieve the purposes mentioned earlier in the present study. In order to analyze the collected data from the two questionnaires the Statistical Package for Social Science (SPSS), 20th version was used. Data analysis procedures for this phase of the study included calculating descriptive statistics, such as means and standard deviations for the whole sample. In order to check the learners' achievement their scores of final exam were examined and used to find the above mentioned analyses.

4. RESULTS

Descriptive statistics including mean, standard deviation, minimum, and maximum were measured for metacognitive awareness inventory. Descriptive statistics are shown in Table 1. Table 1 indicates descriptive statistics of EFL learners' declarative knowledge (DK), procedural knowledge (PK), and monitoring (M). As seen in the Table, DK enjoyed a mean of 31.180 and standard deviation of 3.264. For PK the mean was 15.458 and the standard deviation was 2.213 and then for M the minimum of the scores was 18, the maximum of the scores was 35, the mean was 26.805 and the standard deviation was 3.582.

Table 1: Descriptive Statistics of Declarative Knowledge, Procedural Knowledge, and Monitoring

	N	Minimum	Maximum	Mean	Std. Deviation
DK	72	26	40	31.180	3.264
PK	72	8	23	15.458	2.213
M	72	18	35	26.805	3.582
Valid N (list wise)	72				

A Pearson product-moment correlation coefficient was computed to assess the relationship between declarative knowledge, procedural knowledge and monitoring. A general scheme of the relationships between English learners' declarative knowledge, procedural knowledge, and monitoring and their achievement is presented in Table 2. The results as indicated in Table 2 revealed that the highest correlation is observed between monitoring and procedural knowledge ($r = .532, p = .000$). In this table, ACH stands for achievement.

Table 2: The Results of Correlation between Declarative Knowledge, Procedural Knowledge, Monitoring and Achievement

	1. DK	2. PK	3.M	4.ACH
1. DK	1			
2. PK	0.456**	1		
3. M	0.433**	0.532**	1	
4. ACH	0.279**	0.139	0.273*	1

**Correlation is significant at the level of 0.05

The results of the first research question as indicated in Table 2 revealed that there was a weak but positive and significant relationship between declarative knowledge and achievement ($r=0.279, p =0.018$).

The second research question was to examine the relationship between procedural knowledge and achievement. As it is shown in Table 2, there was no significant relationship between learners' procedural knowledge and their achievement ($r=0.139, p=0.245$).

In order to assess the relationship between learners' monitoring and their academic achievement a Pearson product-moment correlation coefficient was computed. There was a weak but positive and significant relationship between learners' monitoring and their academic achievement at the level of 0.05 ($r= 0.273, p =0.02$).

A correlation coefficient of 0.532 indicated the moderate, positive and significant relationship between monitoring and procedural knowledge among Iranian EFL university students at the level of 0.01 (Table 2).

To answer the last research question aiming at examining relationship between monitoring and declarative knowledge, Pearson Correlation Coefficient was also used. As it can be seen in Table 2, there was a positive and significant relationship between learners' monitoring and declarative knowledge ($r= 0.433, p =0.000$).

5. DISCUSSION AND CONCLUSION

The present study explored the associations among declarative and procedural knowledge, monitoring, and language achievement. Regarding the first research question, the findings of the current study via correlational analysis indicated that there is a weak but positive and significant relationship between declarative knowledge and achievement. In other words, EFL students with high declarative knowledge have high scores on their achievement. According to Schraw and Gregory (1998), declarative knowledge pertains to knowledge about

oneself as a learner and about the factors can affect one's performance. So it implies those students who had had a vivid knowledge about their learning preferences and achievement had better academic performance.

With regard to the second research question, the probable relationship between procedural knowledge and academic achievement among EFL learners, the findings of this study showed that there is no significant relationship between learners' procedural knowledge and their achievement. So the results of this study rejected the second null hypothesis. As Schraw and Gregory (1998) mentioned, procedural knowledge refers to knowledge about doing things. According to Noteborn, Hebert, Carbonell and Gijsselaers (2013), procedural knowledge does have a positive influence on academic performance. It can be justified that EFL learners don't care and think about the strategies of how to implement learning procedures.

Considering the third question, investigating relationship between monitoring and academic achievement among Iranian EFL students, the findings of the current study revealed that there is a significant relationship between monitoring and academic achievement. So the majority of the learners who had high level of metacognition were found to be above average in academic performance and were more able to control their academic achievement through the process of awareness of comprehension and task performance. They are attentive of using efficient strategies while involving in activities.

With regard to the fourth question, findings of this study showed that there is a moderate, positive and significant relationship between monitoring and procedural knowledge among Iranian EFL university students. Higher scores on procedural knowledge correlated with high monitoring. It can be concluded that according to Pressley, Borkowski, and Schneider's (1987) definition of procedural knowledge and Schraw and Gregory's (1998) definition of monitoring, students who are aware of their own learning are able to perform tasks more automatically.

With respect to the last question, exploring relationship between monitoring and declarative knowledge, the findings of the study according to Pearson Correlation Coefficient presented that the relationship between these two factors of metacognition is significant and also positive. The students who know themselves and have knowledge about the factors which affect their performance are able to use strategies which are not hinders of learning while engaging in activities.

The findings of the study revealed that the majority of those who had high level of metacognition were found to be above average in their academic performance and also it was shown that metacognition was significantly associated with students' academic achievement.

From what has been stated above, it was demonstrated that metacognitive awareness and self-regulation can improve academic performance (Bransford, Brown, & Cocking, 2000, Pintrich, 2002; Pintrich & De Groot, 1990; Zimmerman, 1994); however, measures of academic performance may vary considerably. As Doyle (2013) mentioned, grade point averages are sometimes criticized because they present a criterion of academic success and not necessarily a criterion of learning (Doyle, 2013).

6. SUGGESTION FOR FURTHER RESEARCH

First, investigating the learners' metacognition according to gender or also age differences to better understand that gender or age can affect students' metacognition and of course their academic achievement.

Second, the whole participants of the current study were selected from 72 EFL university students. So, the number of participants is very restricted and it is suggested that future research in this realm can be carried out with a large number of EFL learners selected from universities and a large number of foreign language institutes to get a more vast understanding of the link between these constructs.

Third, all of the participants of the current study are in their second and third year of BA part of education. So, it is suggested that this study can be done in a wide range of EFL learners including MA students of English or focus on learners at higher and lower levels of language proficiency of foreign language institutes. In order to notice whether the new findings are consistent with the findings of the current study or not.

Fourth, this study has been done with English language and literature and English language teaching students, it can be done with Translation students.

Fifth, The Persian translated and validated version of the modified metacognitive awareness inventory questionnaire was not available, so it was administered in the original form. It is suggested that the Persian version of the questionnaire be validated and employed in further research and of course among freshman and sophomore students.

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