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An Investigation into Metacognitive Awareness Level: a Comparative Study of Iranian and Lithuanian University Students

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Abstract

The presented article reports on an empirical and comparative study that aimed at investigating the overall level of metacognitive awareness of Iranian and Lithuanian university students, as well as its weakest and strongest sub-components and related metacognitive awareness inventory (MAI) items. To obtain a detailed measure of the levels of metacognitive awareness of the two groups, with a total sample size of 755, Schraw and Dennison's (1994) MAI was used. Data comparisons show that Lithuanian university students have a medium level of metacognitive awareness, while a low level has been detected in Iranian students. Upon examining the subcomponents of the knowledge of cognition component, the mean score obtained for declarative knowledge was found to be highest in both groups. Although in the Iranian group the lowest mean score was related to conditional knowledge, in the Lithuanian group it was procedural knowledge. Considering the regulation of cognition component, the highest mean score was obtained in the planning subcomponent in the Iranian students and in the evaluation subcomponent in the Lithuanian students, while the lowest mean score was obtained in the monitoring subcomponent in the Iranian students and in the debugging subcomponent in the students. The results of this study may contribute to improving the quality of teaching and learning.

Keywords: *metacognitive awareness, knowledge of cognition, regulation of cognition, students' beliefs, university studies*

Introduction

Over the last few decades, metacognition has become one of the most significant concepts in theories of educational psychology (Flavell, 1976; Schraw, Olafson, Weibel & Sewing, 2012). This has led to a changing perspective from a product-oriented to a process–oriented approach to the learner's mind. Metacognition is associated with the theory of mind. It is the ability to understand the mental state of oneself or others. In fact, mentalizing our mental states occurs before mentalizing about others.

As recent studies have elaborated on the ingenious role of metacognition in transforming old concepts, problem solving, critical and creative thinking and learning achievement (Gok, 2010), there is a growing requirement for a better understanding of the nature and conceptualization of this unclear construct. The most common approach among all the definitions is regarding it as a componential rather than uni-dimensional one. Flavell (1976), who coined this concept, introduced it as "one's knowledge concerning one's own cognitive processes and products" (p. 232), while Schraw & Dennison (1994) described it as knowledge and regulation of cognition with more focus on its pedagogical implications.

Metacognition is also thought to play the main role in self-regulation (Zimmerman & Schunks, 2011), encouraging reflective thinking (Efklides, 2009; Kramarski & Michalsky, 2009; Pucheu, 2008), self-efficacy (Schunk, 2008), building self-confidence to make decisions quickly and emotional-motivational constructs (Doğan, 2016).

Studies of the topic revealed that effective learners who have a higher level of metacognitive awareness are more strategic, more involved in the learning process and problem solving and socially more interactive with their classmates than their ineffective counterparts. Moreover, they apply more suitable metacognitive strategies, have confidence and tendency to practice thinking skills, possess more information about their own cognition, process new information more effectively and predict their scores better than novice ones who are not aware of these skills (Schraw & Dennison, 1994).

Still, metacognitive awareness is not always easy to integrate in a classroom. On the one hand, lecturers can have students with various levels of metacognitive skills and, on the other hand, the current training schedules, which are mostly traditional, unrealistically long, and underestimate the role of metacognitive awareness in students' success. As a matter of fact, the workshops offered by universities to get lecturers fully involved in the learning process with small and large group discussions, activities and exercises do not often focus on the development

of metacognitive awareness in the classroom (Pucheu, 2008). Since the notion of encouraging metacognitive awareness instruction in Lithuania and Iran, the two contexts of this study, has not yet penetrated the university curriculum, effective programs are required to guide teachers to understand students' learning needs in this field (Prytula, 2012; Pucheu, 2008).

Since teachers play an important role in helping students to develop metacognitive awareness (Pucheu, 2008), teachers' development of their own metacognitive skills is needed, so that they can support their students (Prytula, 2012; Pucheu, 2008). Therefore, effective teaching and learning depends upon both students' and teachers' levels of metacognitive awareness (Pucheu, 2008).

Previous studies have advocated the usefulness of raising and training learners' metacognitive awareness. However, it is fundamental that before starting metacognitive instruction in any setting, the nature of learners' metacognitive awareness is explored. To the best of my knowledge, no research has sought to investigate the overall level of metacognitive awareness in such a detailed manner and especially comparing students in two different countries, such as Iran and Lithuania, using Schraw and Dennison's MAI (1994). Only a few research studies measured metacognitive awareness of Iranian or Lithuanian university students in specific skills or subskills such as reading, writing, listening, speaking, grammar, vocabulary or language proficiency. Consequently, the lack of relevant research in both contexts burdens the researcher mission in comparing and contrasting the findings of current research with the relevant international literature.

In this direction, the presented study aims to assess and compare the general metacognitive awareness levels of Lithuanian and Iranian university students considering two-dimensions – knowledge and regulation of cognition – their related subcomponents and the MAI items, in order to unveil weaknesses and strengths in each component in detail.

In particular, the study sought answers to one primary and three secondary research questions:

RQ1. How does the level of metacognitive awareness of Lithuanian university students differ from/compare with that of Iranian students?

RQ1.1. Which group has a higher/lower level of metacognitive awareness?
RQ1.2. Which component and sub-component of metacognitive awareness is weaker/stronger in Lithuanian and Iranian students?

RQ1.3. What is the sequence of MAI items like, from the highest scores to the lowest ones in each group?

The relevance of exploring university students in these two settings is related not only to personal reasons, as the researcher is an Iranian conducting her studies

in Lithuania, but also to contextual factors that nowadays affect research worldwide. In a globalized and interconnected world, which allows us to access the latest information across the globe, various educational and learning issues can best be detected and solved from an international-comparative viewpoint. Students from Iran and Lithuania differ in language (though both languages originated from the Indo-European languages), culture, social environment, interests, prior learning experience and curriculum. These factors have a huge impact on their learning (Zohar & Dori, 2012). Thus, investigating similarities and differences between these two countries in the field of metacognitive awareness can add valuable information to learning not only in these two contexts but also in other academic settings.

The following section briefly defines metacognitive awareness and its components, and describes related research into metacognitive awareness levels of university students in various countries.

Methodology

Population

Participants in this study, who were selected randomly, comprised 755 undergraduate students, 296 from 3 universities in Vilnius (Lithuania) and 459 from 3 universities in Tehran (Iran). Overall, 58% were female while 42% were male, with the majority aged between 18 to 25. The students from both countries were majoring in various fields of study including social sciences, management, art, psychology, philosophy, engineering and law. The researcher gathered data while the students were attending ESP (English for Specific Purposes) or any other English course.

Instrument

The students completed a questionnaire consisting of two sections, a demographic part and the MAI, a questionnaire developed by Schraw and Dennison (1994) to measure metacognitive awareness. The self-administered questionnaire consisted of 52 items classified into eight sub-components subsumed under two broader components: knowledge of cognition with 3 sub-components of procedural knowledge, declarative knowledge and conditional knowledge, and regulation of cognition with 5 sub-components of information management strategies, debugging strategies, planning, comprehension monitoring and evaluation. The MAI was chosen for the present study because it was designed to measure

metacognition in general, instead of a particular field of study, and its target population is university students. Since the original questionnaire was changed from True/False options to "strongly agree", "agree", "neutral", "disagree" and "strongly disagree" and the options were given values from 1 to 5 accordingly, the most important calculation first was to prove that the questionnaire was still reliable in a university context. The criteria for judging students' metacognitive awareness level are shown in Table 1.

Table 1. Grading criteria of metacognitive awareness level

Metacognitive awareness level	Mean	Options
High	4.5–5.0	Strongly agree
	3.5–4.4	Agree
Medium	2.5–3.4	Neutral
Low	1.5–2.4	Disagree
	1.0–1.4	Strongly disagree

Piloting phase

In the piloting phase of this study, the questionnaire was given to 833 students with the same characteristics as those of the real participants in this study to check the validity and reliability of the metacognitive awareness questionnaire. The Cronbach Alpha reliability index for 52 items was .88. Principal component analysis with varimax rotation was conducted to assess the underlying constructs of the 52 items of the metacognitive awareness questionnaire. The Kaiser-Meyer-Olkin degree of .87 is higher than .60, hence, the sample size (833) was sufficient for the purpose of the study. The probability associated with Bartlett's Test is also significant (less than .05) and correlations between variables are all zero. So, the use of factor analysis is allowed and successfully conducted.

After gathering data from main population, the questionnaire was submitted to quantitative analysis using SPSS, which included both the use of descriptive and inferential statistics.

Data analysis and results

Groups' level of metacognitive awareness with the sequence fromhe strongest to the weakest subcomponents

Table 2. Knowledge of cognition and its subcomponents descriptive statistics.

	No. Iran/ Lithuania	Minimum	Maximum	Mean	Std. Deviation
Knowledge of cognition	456/296	1.12/1.59	3.76/4.00	2.27/2.71	.698/.348
Declarative	459/296	1.00/1.63	4.25/3.88	2.32/2.77	.827/.405
Procedural	459/296	1.00/1.00	4.75/4.50	2.25/2.66	.837/.588
Conditional	459/296	1.00/1.40	4.60/4.20	2.22/2.67	.777/.504

As seen in Table 2, the Iranian learners' metacognitive awareness levels were low (2.27) in comparison to those of the Lithuanians (2.71, which were medium in terms of the knowledge of cognition component.

Upon examining the subcomponents of the knowledge of cognition component, the mean score obtained for declarative knowledge (2.32) was found higher in the Iranian group. The same was true for declarative knowledge in the Lithuanian group (2.77).

Table 3. Regulation of cognition component and its subcomponents descriptive statistics

	No. Iran/ Lithuania	Minimum	Maximum	Mean	Std. Deviation
Regulation of cognition	459/296	1.20/1.71	3.49/3.40	2.20/2.68	.652/.260
Comprehension Monitoring	459/296	1.00/1.29	4.43/4.00	2.13/2.67	.683/.475
Debugging	459/296	1.00/1.20	4.40/4.20	2.20/2.63	.770/.572
Evaluation	459/296	1.00/1.50	4.33/4.33	2.19/2.76	.832/.515
Information Management	459/296	1.00/1.60	3.70/4.10	2.23/2.64	.743/.402
Planning	459/296	1.00/1.43	4.43/4.43	2.24/2.71	.761/.458

As seen in Table 3, the Iranian learners' metacognitive awareness levels were low (2.20) in comparison to those of the Lithuanians (2.68), which were medium in terms of the regulation of cognition component. Considering this component,

the highest mean score in the Iranian group was obtained in the planning subcomponent (2.24) and the lowest mean score was obtained in the comprehension monitoring subcomponent (2.13). In the Lithuanian group, the highest mean score was obtained in the evaluation subcomponent (2.76) and the lowest mean score was obtained in the debugging subcomponent (2.63).

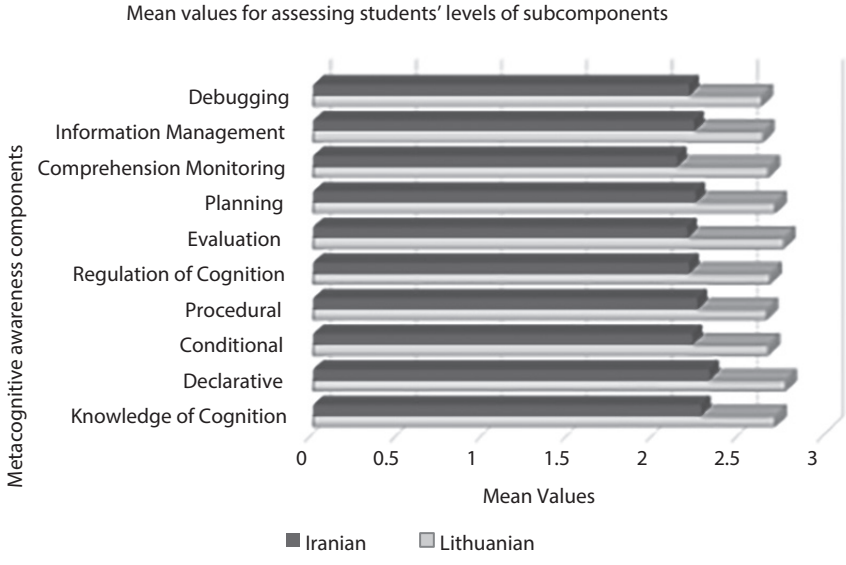

Figure 1. The mean values of two groups on all subcomponents of metacognitive awareness

The sequence of MAI items from the highest to the lowest score in each group

In order to categorize the items from the weakest to the strongest ones for both groups, the items were categorized based on the total score of all the participants in each item for both groups.

The first half of the items were chosen as the weak ones and the second half were chosen as the strong ones. For example, in the Lithuanian group, item 51 (I stop and go back over new information that is not clear), with the score of 702, is the item that the Lithuanians are least metacognitively aware of and item 42 (I read instructions carefully before I begin a task), with the score of 879, is the item that the Lithuanians are mostly metacognitively aware of. Based on the following , the Lithuanians are very weak at items 51, 49 (I ask myself if I learned

as much as I could have once I finish a task) and 4 (I pace myself while learning in order to have enough time).

Regarding the Iranian group, item 43 (I ask myself if what I am reading is related to what I already know), with the score of 912, is the item that the Iranians are least metacognitively aware of and item 12 (I am good at organizing information), with score of 1169, is the item that the Iranians are most metacognitively aware of. Based on the following data, the Iranians are quite weak at items 43, 2 (I can consider several alternatives to a problem before I answer) and 11 (I ask myself if I have considered all options when solving a problem).

Discussion

The present study aimed to explore the overall metacognitive awareness levels of Iranian and Lithuanian university students. Additionally, it compared and contrasted different metacognitive awareness subcomponents and related MAI items in the two groups of students.

Following the analysis of the data gathered, it was concluded that the Iranians have a low level of metacognitive awareness, which was in parallel with the research results obtained by Sperling et al. (2004), whereas the Lithuanians have a medium level of metacognitive awareness, which coincides with Yesilyurt (2013) and Aljaberi and Gheith's (2015) findings. There might be numerous reasons for the low level of metacognitive awareness of the students, such as lack of readiness for replying to questions and lack of "familiarity with scientific reasoning beyond MAI to be able to evaluate his/her metacognitive awareness properly" (Schraw & Moshman, 1995, p. 367), since effectiveness of some teaching and learning techniques in the Western countries may not be appropriate in the Asian ones and vice versa, as Prytula (2012) stipulated. Another reason can be that expert learners can monitor, regulate and evaluate their own learning process automatically (Sperling et al., 2004). However, we have many experienced students that are conscious of their metacognitive strategies but their metacognitive processing has not yet become automatic. Further to metacognitive awareness, many other factors such as low level of self-efficacy, self-belief and motivation and negative emotion and attitude can explain learners' weaker outcomes in replying to MAI questions in spite of their high level of metacognitive awareness. The other reason can be the self-reporting nature of the inventory, which cannot assess the real level of metacognitive awareness since it does not indicate how they use them in an authentic learning situation (Aljaberi & Gheith, 2015).

In our study, the sequence of the knowledge of cognition subcomponents from the lowest to the highest in the Lithuanian group was procedural, conditional and declarative. These results are consistent with the general trend obtained from Alkan and Erdem (2014), Kalley (2012) and Young and Fry (2008). The sequence for the Iranian group was conditional, procedural and declarative, which was not in line with what was proposed by the above researchers. The sequence of regulation of cognition subcomponents from the lowest to highest in the Lithuanian group was debugging, information management, monitoring, planning and evaluation. Yet, the order was monitoring, evaluation, debugging, information management and planning in the Iranian group. The findings in this study in both groups were not in line with what was proposed by Alhamouri and Abu Mokh (2011) and Yunus et al. (2009). On the other hand, Costabile et al. (2013) confirmed the findings regarding the sequence of regulation of cognition subcomponents in our Lithuanian group. The Lithuanians' declarative and conditional knowledge was discovered to be higher than procedural knowledge, which proved the students' lower strategic knowledge when compared to their knowledge of when and why. This means that they do not allot enough time for various activities that need much more application of different strategies. If they deal with a more demanding task, they can be more metacognitively active. Regarding the regulation of the cognition subcomponents, the had the highest scores in evaluation and the lowest scores in debugging. It can be reflected that they do not employ sufficient strategies targeted at correcting conceptions and errors in their learning process and they can manage their analysis of performance and strategy effectiveness after a learning episode moderately well.

Conclusion

Through the large-scale metacognitive awareness measurement and rigorous analysis in each group, we got access to in-depth explicit and predictive information, which can be a benchmark criterion for the admission of students to university. Also, we can recognize the level of the students' success and failure in that semester and prevent their failures with simple, low-cost and replicable metacognitive training. The findings of this research provided a hint as to where to start investigating the problematic areas in learners' metacognitive awareness and determined what type of metacognitive knowledge and regulation skills the students reportedly utilize or require while learning.

Lecturers should explicitly explain to learners the result of their metacognitive measurement with a focus on their weaknesses. As Metcalf and Finn (2008) said,

knowing about the results of students' assessments helps us explore new information and expand our knowledge both for lecturers and students and helps students to consider a process-oriented approach more than a product-oriented one. It not only affects the students' self-beliefs and attitudes positively as emotional factors (Doğan, 2016), which impacts on their level of self-efficacy and increases their confidence, but it also motivates them to adopt mastery goals rather than performance ones and competent metacognitive strategies for academic success, which can enhance independent learning.

An instructor who has a higher level of metacognitive awareness and discovers more about the metacognitive awareness levels of his/her learners can adapt his/her teaching to the constantly evolving educational environment through considering the learners' needs, develop his/her pedagogical knowledge (Kramarski & Michalsky, 2009), transfer his/her knowledge into his/her classrooms properly (Pucheu, 2008), foster the metacognitive awareness of the learners (Prytula, 2012; Pucheu, 2008), and create an open atmosphere, which makes learners feel positive to take more responsibility for their own learning with less tutoring sessions.

Metacognition is malleable, especially at a relatively older age and even in large and online classes, where lecturers have little chance to know students individually. Lecturers can use the MAI as a screening tool to pinpoint weakness areas of the learners even in detail from each statement of the inventory to tailor made metacognitive teaching to meet the learners' requirements. We expect that all learners in a class with any level of metacognitive awareness can enjoy metacognitive awareness teaching. However, learners with a higher level of metacognitive awareness will improve more significantly and faster if we can have both theoretical and practical studies to find out the most effective components associated with their improvement.

Apart from learning about their results on the MAI, learners can elaborate on their exposed problems, how they deal with them, how they prepare for exams and apply strategies in general before and during the training. In this way, not only the students become motivated to learn with such a learner and learning-centered approach at an early stage of the semester, but also the lecturers perceive learners' emotional-motivational constructs and can explain each required strategy with the rationale behind each strategy use (Schraw et al., 2012), so that finally the strategy itself becomes part of students' procedural knowledge.

Future studies may wish to assess lecturers' **beliefs and their pedagogical knowledge including applied metacognitive strategies in their classes** and identify lecturers' beliefs about the level of metacognitive awareness of their students. Training programs for students on how to adopt and use effective metacognitive

strategies and their impact on different variables such as performance, goals, efficacy, emotion and motivation are another idea which is worth exploring.

Implications and limitations

The findings of this study might have implications for university students, lecturers and materials developers in the field of teaching and learning. It may increase lecturers' ability to address student learning needs, promptly recognize struggling students' strengths and weaknesses, prepare metacognitive instructional designs, improve their pedagogical knowledge, manage educational complexity and encourage learners to take an active self-regulated role in learning. Materials developers should evaluate the curriculum and modify it as necessary and design materials with metacognitive tasks to encourage the use of metacognitive strategies.

The main limitation of this study is the use of a self-report questionnaire. Multiple methods can be used to assess it, such as think aloud and interview, which enables the researcher to hold eye contact with the interviewee and take note of comments which are of particular interest. A further limitation is that the study did not address the actual student employment of metacognitive strategies during teaching and learning. The researcher would like to address this gap in a future study by exploring how to accurately measure what students do in the classroom. Finally, the study was restricted to the BA and BS undergraduate students in both groups. Despite these limitations, the study results, due to the large random sample size, can be generalized to whole related populations.

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