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Investigating the Relationship Between Academic Self-Regulation and Metacognition with Students' Academic Achievement

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Abstract

Purpose: The present study was aimed at investigating the relationship between academic self-regulation and metacognition with students' academic achievement.

Methodology: This was an applied research and followed a descriptive correlational method in terms of data collection. The statistical population included all students in Gilan-e-Gharb. 110 of them were selected through multi-stage cluster sampling method to participate in the study. To collect data, the self-regulatory questionnaire and Ryan & Connell (1989) and O'Neill and Abedi metacognition questionnaire were used.

Findings: The results showed a significant relationship between self-regulation and its dimensions including internal self-regulation, external self-regulation, cognitive self-regulation and internal motivation with student's academic achievement. In addition, there was a significant relationship between metacognition and components of innovation and collaboration with students' academic achievement and the components of innovation and collaboration could predict students' academic achievement ($P < 0.05$).

Conclusion: Teachers can play an effective role in students' academic achievement by creating a climate of collaboration and assistance among students in addition to creating a positive attitude toward the environment.

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1. Introduction

Today, students' academic achievement is considered as an important indicator for evaluating educational systems. Additionally, academic achievement has always been important for teachers, students, parents, theorists and researchers because this factor is not only an important criterion in assessing teachers' performance, it is also a reflection of the scientific ability of individuals to enter the world of work, employment, and higher educational levels (Marsh, Martin, 2011). The academic achievement index is an achievement that is widely and commonly measured (Komarraju, Karau, Schmeck, Avdic, 2011). On the other hand, it is associated with many influential factors including the value system of the school, the emotional relationships within the school, the system of punishment and encouragement, the appropriateness of the teacher, the structure of the class, the teaching method, and so on taking (Rasberry, & etal, 2011). In addition to these factors, proper and vital physical atmosphere can somehow play a role in this process that has been less considered in conducted studies. In fact, physically fit and vibrant space is an indirect factor directly affecting schools directly and students indirectly (Dotterer, Lowe, 2011). School environment is one of the factors influencing the activity of schools and teachers. In fact, school environment is associated with the management of school education which considers schools as an official organization. Therefore, this environment is similar to social groups in terms of objectives, roles' outcomes, organizational structure, reward systems, collaborative activities, and parent communication. For many years, the school's atmosphere has been studied as an essential aspect of each school. In addition, environment is a ground for the formation of many behavioral features. In other words, many emotions, habits, tastes, and even attitudes, meetings, and take-offs are dramatically influenced by the environment. After their residential environment, students spend most daily hours in their educational units. Given the basic role of education in shaping the culture of society, it is important to pay attention to the learning process to create a desirable environment that stimulates students' enthusiasm and motivation to learning (Best, Miller, Naglieri, 2011).

In spite of the many efforts made to make schools more effective in general nowadays, school weaknesses are still seriously criticized. On the other hand, physical education course has become important in the world education system. Attention to the physical education course in schools is so important that the first and second articles of the UNESCO charter considers physical education and sports as the fundamental right of all children and adolescents and in order to balance and strengthen the relationship between physical activity and other components of education, national institutions are required to improve and develop physical education. But, as implicitly mentioned, few studies have investigated this important factor in the field of exercise and training in relation with its effectiveness. This process cannot help to achieve a comprehensive understanding of the student's academic achievement and its influential factors and cannot illustrate the link between these factors and students' academic achievement (Lounsbury, steel, Loveland, Gibson, 2004).

In different societies, specialist and psychology groups have always emphasized various aspects of education and the identification of factors affecting it because not only students and their families, but society also spends a lot on students at different levels of education. Therefore, achieving positive results in the field of education (by identifying and controlling factors affecting academic achievement) can lead to a comprehensive progression of students and society (Man-Chih, 2006). One of these factors is academic self-regulation. Self-regulation in learning is one of the categories that deal with the role of the individual in the learning process. This construct was first introduced by Bandura in 1967. Self-regulation defined as mental efforts in controlling the inner state and processes and functions to achieve higher goals (Bembenutty, 2008). The importance of this concept in learning academic and occupational achievement is so great that different scholars have presented different models of it. Ryan & Connell (1989) is one of these models. In this model, learning self-regulatory is subdivided into subcategories of external self-regulation, internal self-regulation, cognitive self-regulation, and intrinsic motivation.

External self-regulation refers to the control of behaviors that are carried out due to externally imposed pressure or compulsion. Internal self-regulation refers to behaviors that are motivated by internal reminders

and pressures such as threats of crime or probabilities related to self-esteem. In cognitive self-regulation, the individual knows the value of behavior and sees it as important for his chosen goals. In intrinsic motivation, the individual acts based on an inner will or desire and directs his activity. What causes the person to continue acting is the inner motives that help him achieve a goal (Lounsbury, steel, Loveland, Gibson, 2004).

In this regard, Samadi (2007) research suggested that self-regulation had a significant relationship with academic achievement. Mardi and Koshaki (2009) also showed that students with higher academic self-regulation had higher academic achievement. Child, Potter and Levine (Samadi, 2007) stated that the human societal environment and the quality of relations between organizations can be either provide an appropriate or inappropriate atmosphere. In fact, the school environment is expressed in the feelings and attitudes of students, teachers and employees about a school and expresses the feeling that students gain from their daily experiences at school. These feelings can affect students' learning and motivation.

Ali-Lilo, Movahedi and Alizadeh (2012) studied the relationship between school climate and class objective structure with the academic performance of high school students. The results of this research showed a significant correlation between the research variables. The result of correlation showed that school atmosphere and class objective structure had a significant relationship with academic achievement, so that they explained 24% of changes in academic achievement.

Qadiri, Asadzadeh and Dortaj (2010) studied the relationship between perception of classroom environment and goal orientation with the academic achievement of third grade students and reported a significant relationship between perception of the classroom environment and students' academic achievement. He also found a meaningful relationship between goal orientation and students' math progress. Finally, the results of his research regression indicated that perceptions of classroom environments could predict academic achievement in mathematics.

Mortazavi (2001) showed that more successful students and students who have a more positive attitude towards their educational environment consider and evaluate educational environments more desirable. In this study, there was a direct or positive correlation between lack of refusal and attitude toward school. Hence, according to the research carried out, the present study was aimed at answering the following questions: Is there a significant relationship between academic self-regulation and its components with students' academic achievement? 2-Is there a significant relationship between metacognition and its components with the academic achievement of physical education students? Do academic self-regulation and its components predict the educational achievement of physical education students? Do metacognition and its components predict the educational achievement of physical education students?

2. Methodology

The study used a descriptive correlational method. This was also an applied research using field information for data collection. The statistical population of this study was all students of Gilan-e-Gharb including 1600 students, according to the latest statistics of education department in Gilan-e-Gharb. Using multistage cluster random sampling method and Morgan table, 110 students were selected to participate in the study. To collect data, the self-regulatory questionnaire and Ryan & Connell (1989) and O'Neill and Abedi metacognition questionnaire were used.

O'Neill & Abedi Metacognition Questionnaire: State-of-the-art metacognition questionnaire was developed in 1996 by O'Neill and Abedi, with the goal of designing a tool for obtaining information on the skills needed to solve a complex assignment (students' ability to systematically think about a task). Pintrich and De Groot (1990) defined metacognition as strategies for planning, reviewing, and changing individual's understanding. In other words, O'Neill and Abedi believe that metacognition means consciously and continuously examining the goal and, if necessary, selecting and applying different strategies. They also designed the content of the questionnaire items based on this definition. This test had 20 phrases and 4 sub-scales of awareness, cognitive strategy, planning and review. To formulate the questionnaire, three

principles of brevity, credibility, and ability were considered. It had four components each having 5 items (Salary Fard, Pakdaman, 2009).

Also, the 17-item standard academic self-regulation questionnaire of Ryan & Connell (1989) was used which included questions about external self-regulation, internal self-regulation, cognitive self-regulation and internal motivation. The responses 4-point spectrum range from "always" 4 points, "often" 3 points, "sometimes" 2 points and "never" 1 point. In this study, the validity of the questionnaire was confirmed using content validity based on experts' opinions and the reliability was also calculated to be 0.77using Cronbach's alpha. According to the subject and the purpose of the study, the collected data were analyzed using frequency, percentage, Pearson correlation coefficient and stepwise regression using SPSS 20 software.

The ethical considerations of participation in the research were as follows: 1- Participants were free for taking and not taking part in the study at any time and without fines. 2. All questionnaires were completed by participants under the supervision of the researcher. 3. An adequate argument was made about the necessity of this study for the participants. 4. All participants were assured about the confidentiality and secrecy of their information. 5. Participants were assured that the results of the research were reported in a way that their material and non-material rights related to the research are considered. 6. At no stage of the research, costs were imposed on the participant. 7. Failure of the individual to participate in the research did not create any inconvenience in providing necessary therapeutic or diagnostic measures.

3. Findings

The results of age distribution of respondents showed that 46.4% of respondents aged 15-16 years old, 35.54% were between 17-17 years old and 33.6% aged between 18-17 years old. In terms of gender, 54.5% of the respondents were female and 45.5% were male. Table 1 shows the mean and standard deviations of research variables

Table1. Mean and standard deviations of research variables

Research variables	Mean	SD
External self-regulation	2/89	0/41
Internal self-regulation	2/98	0/51
Cognitive self-regulation	2/75	0/74
Internal motivation	2/38	0/66
Self-regulation	3/42	0/38
School sources	2/88	0/59
Students' relationship	3/06	0/62
Decision making	2/9	0/51
Innovation	3/1	0/38
Cooperation	3/08	0/64
Metacognition	55/16	9/87
Academic achievement	15/14	1/49

The Pearson correlation test was used and the results are presented in Table (2).

Table2. Pearson correlation between academic self-regulation and its components and metacognition and its components with academic achievement

Academic achievement	Pearson correlation	Sig.
Self-regulation	0/488	0/000
External self-regulation	0/327	0/006
Internal self-regulation	0/316	0/008
Cognitive self-regulation	0/479	0/000
Internal motivation	0/356	0/003
Metacognition	0/647	0/002
School sources	0/187	0/269

Students' relationship	0/032	0/616
Decision making	0/029	0/656
Innovation	0/466	0/000
Cooperation	0/527	0/000

Based on the results of Table 2, at a significant level of 0.05, there was a significant relationship between self-regulation and correlation intensity (0.448), external self-regulation and correlation intensity (0.432), internal self-regulation and correlation intensity (0.396), internal motivation and correlation intensity (0.479), metacognition and correlation intensity (0.647), innovation components and correlation intensity (0.466) and collaboration and correlation intensity (0.527) with students' academic achievement. Stepwise regression was used to determine the extent to which academic self-regulation dimensions predicted academic achievement. The results are as follows:

Table3. Model fit results

Predictive variables	B	Beta	T	Sig.
Fixed value	12/357	-	12/612	0/000
Cognitive self-regulation	0/735	0/439	4/23	0/000
External self-regulation	0/795	0/259	2/49	0/015
Internal self-regulation	0/095	0/087	0/689	0/493
Internal motivation	0/116	0/159	0/314	0/193
F statistics value		14/027		
Sig.		0/000		
R^2		0/295		
Adjusted R^2		0/274		
Durbin–Watson statistic		1/807		

259) were positive at 95% significance level having a direct and significant relationship. Based on the results, the coefficient of determination for academic achievement was 0.295 and this value indicated that 29.5 percent of the changes in academic achievement were explained by changes in external self-regulation and cognitive self-regulation. Given the fact that the Durbin–Watson statistic ranged from 1.5 to 2.5 at a standard distance, the independence of the residuals could be concluded. According to the above table, the significance level calculated for this F statistic was 0/000 and indicating the significance of the regression at 95% level. According to the indexes, the model was qualified and external self-regulation and cognitive self-regulation could predict students' academic achievement.Stepwise regression was used to determine the extent to which metacognition and its dimensions could predict the criterion variable (academic achievement) and the results are analyzed in Table (4).

Table4. Model fit results

Predictive variables	B	Beta	T	Sig.
Fixed value	0/775	-	5/92	0/000
Metacognition	0/126	0/023	0/336	0/667
Students' relationship	0/312	0/069	0/193	0/473
Decision making	0/446	0/073	0/216	0/592
Innovation	3/232	0/411	4/29	0/000
Collaboration	1/776	0/349	2/779	0/000
F statistics value		5/14		
Sig.		0/000		
R^2		0/169		
Adjusted R^2		0/163		
Durbin–Watson statistic		2/58		

According to table (3), the coefficient of innovation (r = 0.411) and cooperation (r = 0.349) were positive at 95% significance level, showing a direct and positive relationship. Based on the results, the coefficient of determination for academic achievement was equal to 169/0 which indicated that 16.9 percent of the changes in academic achievement were explained by changes in factors of innovation and collaboration.

Given the fact that the Durbin–Watson statistic ranged from 1.5 to 2.5 at a standard distance, the independence of the residuals could be concluded. According to the above table, the significance level calculated for this F statistic was 0.001 indicating the significance of the regression at 95% level. According to the indexes mentioned, the model was qualified and the variables of innovation and collaboration had the ability to predict students' academic achievement.

4. Discussion

The results of this study showed that there was a significant relationship between academic self-regulation and academic achievement and external self-regulation and cognitive self-regulation could predict academic achievement of students. There was also a significant relationship between metacognition and academic achievement of students and the components of innovation and collaboration were capable of predicting students' academic achievement. These results were consistent with the results of Samadi (2007), Mardi& Koshaki (2009), Sunger and Gunggoren (2009) and Kuperminc et al. (1997). Learning self-regulation is an active and organized process in which learners chooses goals for learning and try to set up, control and monitor their cognition, motivation and behavior. Self-regulation helps students monitor their learning while engaging in a task and choose successful strategies. Self-regulation is the central point of effective functioning in impulse control, time management, and coping with stress that is related to the context of education and also associated with the self-reference system, goal orientation, emotional and cognitive processes, self-efficacy and motivation. In addition, the school environment can be regarded as one of the capabilities and assets of the educational institution and will help to create and share knowledge and, consequently, assists student's academic achievement. Group collaboration makes students more interactive and interactive and analyzes and evaluates each other's perspectives. In other words, students achieve higher levels of learning in this way. Meanwhile, when a class or an educational place follows a non-grouped approach, students learn more at lower levels, such as learning knowledge and do not have the opportunity to access and analyze content. The constructive collaboration with others is effective in human progress and success and if students learn the skills of adapting to people, they will be able to adapt in their personal and social lives by the promotion and repetition of this skill. Students acquire this skill in the light of group activities and through the emergence and dispersal of tastes with the guidance of their teacher. It can also be asserted that if metacognition is excelled in a school environment involving innovation and creativity, a variety of student issues such as easier and faster learning will be solved, consequently resulting in higher students' academic achievement.

Due to the strong relationship between academic self-regulation and metacognition with academic achievement, it seems that providing a learning environment and a classroom structure that will lead students to self-regulation will play an important role in their academic achievement. It is suggested that teachers, through appropriate classroom management strategies, can be helpful in enhancing students' inner motivation and subsequently their academic achievement. Parenting education is recommended for familiarizing them with autonomous support environments and its effects on long-term motivation and internal sustainability for the learning of their children. According to the results of the study, it is suggested that student meetings be organized at the school level to create a condition in which students can express their feelings and expectations without any worries including educational and non-educational ones.

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