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Effects of the Instruction of Learning Techniques Based on the Idea of Meta-Cognition on Increasing Achievement Motivation and Academic Achievement of Sixth-Grade Students of Elementary School in Bavanatin the 2012-2013 Academic Year: Short Communication

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ABSTRACT

The purpose of the present study was to evaluate the effects of direct instruction of learning and meta-cognition techniques on increasing achievement motivation and academic achievement among the population under study. The present study is a pilot study with pre-test and post-test administered on one control and two experimental groups. The population under study included all male and female six-grade students in elementary schools of Bavanat (a small town in Fars Province) who were attending school in the 2012-2013 academic year. The research sample consisted of 56 students (28 females and 28 males) selected through random clustering sample. The means of both control and experimental groups on the pre-test of learning strategies and the achievement motivation were almost the same. The two experimental groups were instructed for 8 sessions on the educational package of learning techniques based on the idea of meta-cognition while the control group did not receive any treatment. The instrument used to collect data was Hermens' Learning Strategies and Achievement Motivation Questionnaire. To measure the students' academic achievement, their scores in the first and second semesters were used. The findings obtained through analysis of covariance indicated that the two experimental and control groups were different from each other regarding achievement motivation and the use of leaning strategies as the experimental group outperformed the control group. Besides, a comparison of the adjusted means of the participants indicated that female students were more motivated than male students. On the other hand, it was noted that gender did not play a significant role in the use of learning strategies (F-1.103, P –N.S). In addition, the findings of the study indicated gender has a significant effect on academic achievement in favor of male students. As a result, the instruction of learning techniques will lead to the improvement of the achievement motivation and academic achievement among six-grade primary school students.

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INTRODUCTION

The importance of the relationship of cognition and meta-cognition as a conventional concept in education with learning process is undeniable. Professionals in the field of education have largely emphasized the importance of innate factors, intelligence, and talent and recently have given an importance to the role of non-intrinsic factors as well.(Aghazadeh, 1998) One of these factors is the frequency with which the teachers use learning techniques. Teaching techniques or tactics refer to specific approaches and strategies which serve the learning process. For instance, the semantic expansion of concepts and subjects to be learned is a learning strategy.(Generald, 2001) On the other hand, imagery, analogy, interpretation, and analysis are tactics that can be used for semantic expansion (Gage and Berliner, 1991). Studies performed on students indicated that many learning and teaching difficulties are resulting from the lack of cognitive and meta-cognitive skills in students. Many learners need training concerning self-regulation, self-assessment, and the diagnosis of their problems (Gageand Berliner, 1991). Even various studies on learning, thinking, and cognitive and meta-cognitive strategies show that these strategies cab be instructed. In other words, teachers can teach these learning skills to

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their students separately or together with other courses students. Besides, after the instruction, students can voluntarily use these strategies and this learning action will have a positive impact on their progress (Seif, 2007). The bulk of field research on the effects of the instruction of leaning techniques on the students' academic achievement in elementary school education concerning students' gender is not so much. As a result, the present study can be significant in that it can reveal how the instruction of leaning techniques my influence elementary school students' academic achievement, enhance their motivation to learn, and reduce their academic failure. Besides, this study can be regarded as a step in analyzing one of the important causes of students' academic failure in elementary school.(Seif, 2007) The experience has shown that many elementary students spend hours studying their courses but they do not come up with satisfactory results and in fact the amount of materials learned is not considerable. The important question is why do the students who struggle a lot to learn and waste much of their time and energy, do not get the desired results? (Weinstein, 1998), and does this reduce gradually students' incentives for academic achievement? (Mitiolimin,2002) Do the students being personally humiliated by others will worsen the problem? (Weinstein, 1998)Is it possible that such students gain better learning outcomes by receiving sound instruction on learning techniques and strategies by teachers? And how much is this learning outcome? .Today, the need for the transition from current teaching practices in schools used by teachers to transfer information to students and the use of memorization techniques and rote learning by students to lifelong learning and retention techniques and a change in teachers' role as instructors to designers, facilitators, trainers, and constructors of the learning environment seems essential (Seif, 2007). Elementary school is one of the very sensitive and important periods in the educational system, providing a perfect opportunity for students to start and continue learning so that if the needed educations and training do not provided to students during this period it would be very difficult to compensate for it in later periods. One of the skills necessary for learning in the elementary school period is the acquisition of leaning skills and techniques based on the idea of meta-cognition that if provided optimally, students may become highly efficient learners. Moreover, attention to the meta-cognitive processes and skills in the era of virtual education and learning and the rapid development of globalization and diversification of learning resources, it is highly significant that students be trained in a way that they be able to plan, direct, and control their learning and participate in the learning process on their own. Through his educational experiences, (Mitiolimin,2002)found that learners in higher education who lack reasoning and the power of judgment, and discretion have not acquired these skills learned in primary school. He believes that memorization is the only worthless skill that is taken into account (Aghazadeh and Vahedian, 1998).

Many professionals including (Jacobsen,1998)argue that any reform in the educational system requires consideration of cognitive research findings and applying such findings in educational programs (Fouladchang, 2005). In recent decades, the study of meta-cognition and its impacts on different school assignments has received much attention from researchers in the field of education. Academic achievement is dependent not only on individuals' basic knowledge, but also on other factors such knowledge of a variety of learning strategies and how to use this knowledge when doing school assignments. (Fouladchang, 2005). With the development of the cognitive systems in human beings, a set of cognitive and regulatory processes will form that contribute to the efficiency and flexibility of the memory and purposeful and deliberate learning. In other words, meta-cognitive skills are informative skills used during learning and information processing and also facilitate this process. Overall, the quality of memory and learning is dependent onmeta-cognition (Kadivar, 2004). The new findings in the field of educational psychology and cognitive psychology have provided valuable tools for the instruction of these cognitive skills so that an individual could reach a higher level of learning goals and understanding (Fouladchang, 1996) On the other hand, an understanding of the concept of motivation and awareness of different motivations and their impact on the process of learning will help teachers to employ more efficient methods for planning and implementing educational programs. Motivation as a definite prerequisite for learning is a variable that is affected significantly by the instruction of learning techniques and strategies adopted to employ each *strategy* (meta-cognition). Accordingly, the present study aims to determine the level of such learning (Seif, 2002).

Research methodology:

The research method used in this study is an experimental method with pre-test and post-test. The population under study all male and female six-grade elementary students in Bavanat who were studying in the elementary public schools in the 2012-2013 academic year. The research sample included 56 students (28 males and 28 males) who were selected through accidental cluster sampling. The mean scores of both the control and experimental groups for learning strategies and academic achievement motivation were almost the same on the pre-test. The two experimental groups received the treatment through the educational package of learning techniques in 8 sessions (4 sessions in March and 4 in April) based on the idea of meta-cognition. However, the control group received no intervention. To measure the students' academic achievement, their scores in the first semester (before the treatment) and in the second semester (after the treatment) were used. The instrument to

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collect the data was Self-Motivated Learning Strategies Questionnaire (Pantrich and de Groot, 1990)that was used to measure students' motivation and their use of cognitive and meta-cognitive learning strategies.

Results of the study:

The data collected were analyzed by descriptive and inferential statistics that are shown in the following tables and figures.

Table1: Results of ANCOVA to examine effects of education and gender on achievement motivation.

Source of variance	Squares	df	Mean squares	F-value	Sig.
Effects of pretest	213.703	1	213.703	9.91	0.003
Effects of experimental and control groups	637.276	1	637.276	29.554	0.0001
Gender effects	159.919	1	159.919	7.416	0.009
Interactional effect of group × gender	22.352	1	22.352	1.037	0.31
Error	1099.726	51	21.563		

As is shown in the table, the results of the two-way analysis of covariance suggested that the instruction of learning and meta-cognitive techniques and gender have no significant effect on achievement motivation (NS = P, F= 0.31). This indicates that the effects of the instruction of learning and meta-cognitive techniques and gender do not depend on gender irrespective of whether learners are female or male. The instruction of learning and meta-cognitive techniques may affect the achievement motivation. Nevertheless, it was noted that the main effects of the experimental groups and gender on the pre-test are significant. In other words, the two experimental groups and the control group were significantly different with regard to achievement motivation (F = 29.555, P = 0.0001). The results of the study also show that the participants in the experimental groups had a higher achievement motivation (67.03) than those students in the control group (59.89) which emphasizes the effects of the instruction of learning and meta-cognitive techniques on students' achievement motivation.

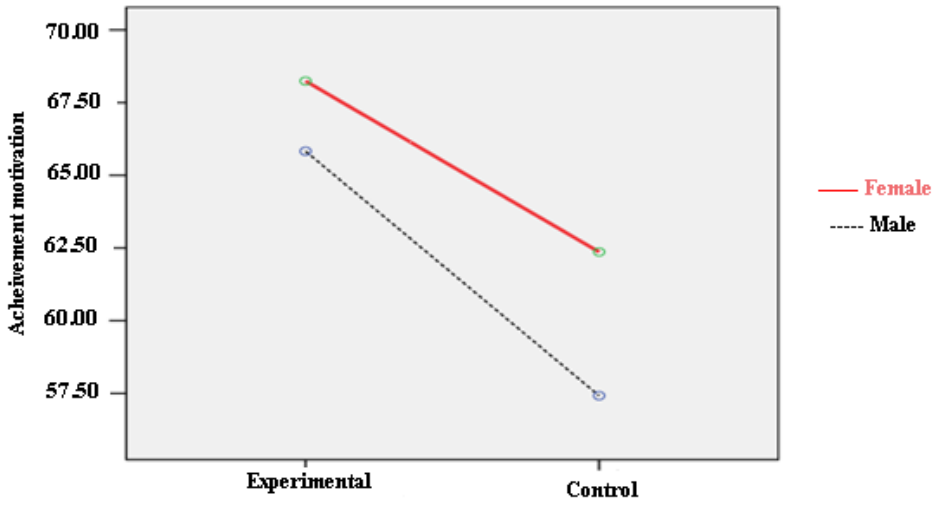

Fig. 1: Effects the instruction of learning and meta-cognitive techniques and gender on achievement motivation.

Table2: Results of ANCOVA to examine effects of education and gender on learning strategies.

Source of variance	Squares	df	Mean squares	F-value	Sig.
Effects of pretest	6042.572		6042.572	54.801	0.0001
Effects of experimental and control groups	4536.098		4536.098	42.138	0.0001
Gender effects	121.576		121.576	1.103	0.29
Interactional effect of group × gender	28.449		28.449	0.258	0.61
Error	5623.50	1	110.265		

As can be seen in the table, the results of ANCOVA test results confirm the effects of the instruction of learning and meta-cognitive techniques and gender on learning strategies are not significant (F = 54.801, P =NS). Other results in the same table suggest that by controlling the pre-test (the level of initial use of learning strategies by students); the main effects of the experimental group on the use of learning strategies are not significant. Besides, gender does not have a significant effect on learning strategies. In particular, it was observed that through controlling initial use of learning strategies by students, both control and experimental groups are significantly differ from each other concerning the use of learning strategies (F = 41.138, P =

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0.0001). Accordingly, concerning the effects of groups on learning strategies, a comparison of the adjusted mean scores shows that the experimental group (259.96) employed learning strategies more than the control group (241.64) which emphasizes the effects of the instruction of learning and meta-cognitive techniques on students' use of learning strategies. The findings also indicated that gender does not have a significant effect on the use of learning strategies. In other words, there is no significant difference between male and female students in using learning strategies (F = 1.103, P = N.S).

Table3: Results of ANCOVA to examine effects of education and gender on academic achievement.

Source of variance	Squares	df	Mean squares	F-value	Sig.
Effects of pretest	122.993	1	122.993	937.39	0.0001
Effects of experimental and control groups	8.867	1	8.867	67.58	0.0001
Gender effects	0.504	1	0.504	3.83	0.05
Interactional effect of group × gender	0.005	1	0.005	0.04	0.84
Error	6.692	51	0.131		

As shown in the table, the interactional effects of the instruction of learning and meta-cognitive techniques and gender on achievement motivation are not significant (F = 0.04, P = N.S).

The findings presented in the table also indicated that by controlling the pretest (student s' achievement in the first semester), the main effects of experimental group and gender on learning strategies are not significant. Concerning the effects of the group education on students' achievement in second semester, the findings indicated that by controlling the effects of the participants' achievement in the first semester, the two experimental groups and the control group were significantly different with regard to achievement motivation (F = 67.58, P = 0.0001). Similarly, concerning the group influence on academic achievement, a comparison of the adjusted average of the participants' GPA in the experimental group (18.38) is higher than that of the participants in the control group (17.56), indicating that the instruction of learning and meta-cognitive techniques will lead to the increased student achievement. The findings also indicated that gender has indeed a significant effect on student academic achievement. In other words, there is significant difference between male and female students concerning academic achievement (F = 3.38, P = 0.05). A comparison of the adjusted means of male and female participants suggested that female participants' achievement (18.08) is higher than that of their male counterparts (17.86) as shown in figure 3.

Discussion and conclusions:

The results of the study generally confirm the positive effects of direct instruction learning and meta-cognitive techniques on dependent variables. Besides the use and the direct instruction of such techniques by teachers in sixth grade elementary classrooms in Bavanat would increase the students' achievement motivation along with academic achievement. It was also noted that male and female students are using equally learning strategies. This will reduce parts of researchers' controversies over the effects of gender on the use of learning strategies. The findings suggested that there is a significant difference between male and female students concerning their academic achievement as the female students had higher achievement than males which is mainly due to higher achievement motivation in female students. Accordingly, it is suggested that future research other factors other than motivation that affect achievement motivation such as cultural differences, maturity and emotional variations between male and female students or their different lifestyle which can be one of the influential factors. In addition, the results of two-way analysis of covariance suggested that the two control and experimental groups differ significantly with regard to achievement motivation (F = 29.554, P = 0.0001). In other words, the experimental group showed a higher motivation than the control group. In addition, it was also observed that gender has a significant effect on achievement motivation and there is a significant difference between male and females concerning achievement motivation (F = 7.416, P = 0.009). A comparison of the adjusted means of the participants indicated that female students were more motivated than male students. In addition, the two control and experimental groups were significantly different concerning the use of learning strategies (F = 41.138, P = 0.0001). In other words, the experimental groups used more learning strategies. In contrast, gender did not have a significant effect on the use of learning strategies (F= 1.103, P = N.S). Other findings indicated that gender has a significant effect on academic achievement which shows that male and female students are significantly different in educational attainment (F = 3.83, P = 0.05). Finally, a comparison of the adjusted means of male and female participants suggested that female participants' achievement is higher than that of their male counterparts.

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