



## The Effectiveness of Teaching wark Cognitive Learning Styles and Metacognitive Strategies on Students' Academic Motivation

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### ABSTRACT

**Background and Aim:** Research findings support the idea that academic motivation can be improved by providing appropriate models and training; Therefore, the aim of this research was to compare the effectiveness of teaching Wark's cognitive learning styles and metacognitive strategies on students' academic motivation. **Method:** This was a semi-experimental study with a pre-test-post-test and follow-up design with a control group. The statistical population of the research included all male high school students in Tehran in the academic year 2019-2020. Among them, 69 students were selected and assigned to three target groups (23 people in each group). Wark Fleming and Mills (1998) cognitive learning styles experiment group had ten sessions and Pentrich metacognitive strategies experiment group (2004) had eight 90-minute sessions. All three groups were evaluated in the three stages of pre-test, post-test and follow-up with Harter's academic motivation questionnaire (1981). The data were analyzed with the statistical test of repeated analysis of variance. **Results:** The results showed that the interventions of wark's cognitive learning styles and metacognitive strategies were effective on the internal motivation to learn ( $F=20.92$ ,  $P=0.001$ ) and the external motivation to learn ( $F=9.26$ ,  $P=0.001$ ) in both groups. **Conclusion:** According to the obtained results, these two strategies can be used to improve students' academic motivation and thus help reduce their stress in the learning process.



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## Introduction

One of the constructs that has attracted much interest from experts in the field of education and research concerning academic progress in recent years is the concept of motivation. Academic motivation answers the question: Why do learners go to school? (Ramos and Habig, 2019). Based on the opinion of Ryan and Desi (2000), the basic human motivations are explained in three dimensions: autonomy (which is defined as the experience and personal independence in the individual), competence (as the ability to experience mastery and achieve results desirable) and connection (as a feeling of closeness and connection with others) and finally three types of intrinsic, extrinsic, and motivation (Lee, Chang, Lucas, and Hirsch, 2019).

Research findings support the idea that academic motivation can be improved by providing appropriate models and training. High and low learning motivation plays a role in predicting and applying actions to achieve better learning (Rahardjanto, Husamah, and Fauzi, 2019). One of the effective structures related to academic motivation is learning styles. In a way, Khodabandeh, Dortaj, Asadzadeh, Falsafinijad, and Ebrahimi Qavam (2013) showed in their research that students' learning styles mean the requirement to use different teaching styles, and this condition explains and predicts the level of students' motivation in learning activities. Moreover, Attarkhamene and Seif (2009) showed that teaching learning strategies significantly positively affect student motivation and academic progress; therefore, this mutual relationship can be taught and is important.

Wark learning styles are one of the most accessible and most comfortable learning approaches among students. The theory of Fleming and Mills (2006) in the context of learners' sensory preferences led to the presentation of a model of learning styles that include four different strategies (visual, auditory, reading-writing, and kinesthetic-motor), which is based on four learning strategies: V) It means the visual style and is used by learners who use visual-graphic methods to acquire information. A) Means the listening style for learners who use listening and verbal information acquisition strategies to learn. R) Stands for reading-writing strategy and is for learners who get the most information

from printed information. This group of people has the most note-taking of class content compared to other methods. K) Means kinetic-movement strategy and it is for learners who use the acquisition of experience and active action in learning (Amaniyan, Pouyesh, Bashiri, Snelgrove, & Vaismoradi, 2020).

Therefore, educators should be aware of students' preferred learning and individual learning styles and create the necessary coordination between their teaching styles and students' learning styles (Bhattacharyya & Sarip, 2014). Because some students have a dominant preferred style, while others combine different strategies, so we may face a group of students with similar characteristics or a group of students with different characteristics in the same class (Espinoza-Poves, Miranda -Vilchez, & Chafloque-Céspedes, 2019), paying attention to these differences in the learning process will have good results.

Therefore, metacognition training or the use of metacognition strategies is considered one of the effective educational approaches. In the metacognition-based study approach, students are taught strategies to evaluate their understanding, determine how much time they need to study, and choose a specific program to study or solve various problems. Metacognition plays a central role in the learning process. For the teacher and learner, relying on metacognition means that learners can improve their learning by becoming aware of their thinking while reading, writing, and solving problems, and teachers can simply increase this awareness by informing learners of effective problem-solving strategies and discussing the motivational and cognitive features of developmental thinking. The basic goal of metacognitive education is self-control and self-learning to become independent learners who can guide, monitor, and modify their cognitive and learning processes toward their own goals. According to the mentioned limitations and the above theoretical foundations, to examine the importance of the research title, the purpose of this research is to investigate the effectiveness of cognitive learning styles and metacognitive strategies on the academic motivation of students in Tehran. In this way, comparing various educational strategies will improve educational and individual awareness of

educational administrators and learners and prevent special learning problems in this field.

### Method

The research method is an experimental type with a pre-test-post-test design of the control group. The independent variables of teaching VARK cognitive styles and metacognitive strategies and the dependent variable is the academic motivation of the first secondary level students. The statistical population of the research includes all the male students of the first high school level in the two cities of Tehran in the year 1399-1400, which according to the latest official statistics of the Department of Education of Tehran is equal to 2400 students. 0.05 and a significance level of 0.05 was estimated for all three groups under investigation, separately for 15 students.

### Tools

**1. Standard questionnaire of academic motivation:** Harter's standard questionnaire of academic motivation (1981) includes 33 items and its purpose is to investigate academic motivation among students. Harter's scale measures academic motivation with bipolar questions, one pole of which is internal motivation and the other pole is external motivation, and the subject's answer to each question can only include one of the external or internal reasons. Since both intrinsic and extrinsic motivations play a role in many academic subjects, Lepper et al. (2005) converted Harter's scale into common scales, where each question is only one of the reasons for intrinsic and extrinsic motivation. Takes This questionnaire is based on a Likert scale (never = 1; rarely = 2; sometimes = 3; most of the time = 4; almost always = 5). The reliability of this questionnaire was obtained by Zahiri and Rajabi (1388) with Cronbach's alpha test above 0.92 and very favorable. Harter (1981) found the reliability coefficients of the subscales between 0.54 and 0.84 and the retest coefficients in a sample during 9 months from 0.48 to 0.63. another sample using the Kuder-Richardson 20 coefficient reported between 0.58 and 0.76 (cited by Zahiri and Rajabi, 2009).

### Results

As can be seen in Table 3, there is a difference between the average of the experimental and control groups in all dependent variables, which means that the experimental groups had a

decrease (extrinsic motivation) and an increase (intrinsic motivation) in the post-test phase. In contrast, the control group had little change in the post-test and follow-up stages. Using parametric tests requires compliance with some basic assumptions, and if the size of the groups is unequal and less than 40 people, by observing the defaults and verifying them, these tests can be used. The necessary assumptions must be met to use variance analysis with repeated measures. The results of these presuppositions are presented below. M-box coefficient for research variables was higher than 0.05. Also, the equality of variances based on Levine's test was higher than 0.05 in both variables and  $p=0.912$  and  $p=0.682$ , respectively. Also, the normality of the data based on the Shaypro-Wilk test due to the sample size of fewer than 200 people is higher than 0.05. Finally, the Mauchly test (assuming the uniformity of covariances or the equality of covariances with the total covariance) for both variables, respectively 0.657 and 999  $P = 0.05$  and higher than 0.05, have been obtained. Observing the F test's presuppositions, the use of this test is unimpeded.

Based on the findings, the difference between the mean scores of external and internal motivation in the three stages of the research is significant ( $P \geq 0.001$ ). Also, the average scores of this variable in the experimental and control groups also significantly differ ( $P \geq 0.001$ ). The results have shown that for the internal and external motivation variables, nearly 38 and 21% of the individual differences are related to the differences between the three groups. In addition, the interaction between research stages and group membership is also significant ( $P=0.001$ ). In other words, the difference between intrinsic and extrinsic motivation scores in the three stages of the research is significant in the three groups. The amount of this difference is about 0.86 and 0.35, respectively. That is, 86 and 35% of the variance or individual differences are related to the differences between the three stages of the test and group membership. Examining the difference between the two treatment methods with paired comparisons of the averages of the three stages of the research using Bonferroni's post hoc test also showed that both VARK and Metacognition training methods were significant in the pre-test, post-test and follow-

up ( $P < 0.001$ ). However, this difference was not significant for the post-test with follow-up ( $P < 0.001$ ).

### Conclusion

The current research aimed to compare the effectiveness of teaching Wark's cognitive learning styles and metacognitive strategies on students' academic motivation. The results of statistical analysis showed that these two educational methods were effective in improving students' internal and external academic motivation. Moreover, the effective coefficient of teaching metacognitive strategies has been higher compared to teaching cognitive learning styles.

Using appropriate strategies will help the learners to look for appropriate strategies. In addition to empowering the students, it prevents them from causing severe crises. One of these strategies is teaching metacognitive strategies. Metacognition includes insight into the weaknesses and strengths of aspects of neurodevelopment (what will be difficult for me and what will be easy for me?). Cognitive strategies help us store new and old information in long-term memory, and metacognitive strategies are tools for guiding and monitoring cognitive strategies. In fact, the learner will use his cognitive strategies with the help of metacognitive strategies. The goal of teaching metacognitive strategies is to transform them into skilled learners who can achieve cognitive progress from cognitive strategies and review this progress through control tools, such as metacognitive strategies, continuously and fundamentally. In confirmation of this explanation, Saxena (2020) showed the effectiveness of metacognitive strategies on self-regulated learning and students' motivation. Moreover, it indicated that the use of metacognitive strategies has led to an improvement in the level of self-regulation and academic motivation in students.

Teaching these strategies to students in the first place and the initial learning steps will depend on external factors such as expert teachers. Because cognitive and metacognitive strategies give teachers the ability to target the learning process for their students' step by step and support them in learning. This education method and two-way communication provide mastery learning for the student, bringing the teacher's involvement in the student's learning

process closer to standard and allowing the student to use the educational materials more. This progress of turning students into people with high self-esteem and positive academic self-concept will reduce the weakness that affects their satisfaction with school and will be a factor in the direction of growth and development. These educational programs, in any title and method, lead to the development and growth of potential capabilities. At the same time, Ghadampour, Khalili Gashnigani and Rezaian (2018) showed the effect of metacognitive package education on students' motivation and academic progress showed that metacognitive package education increases students' internal motivation and academic progress.

### Conflict of Interest

According to the authors, this article has no financial sponsor or conflict of interest.

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