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# The mediating role of academic engagement in the relationship between self- regulation and self-efficacy with academic performance

**Seyede Khadije Amirian[1], Shirin Amani[2], Mohammad Saeed Abdkhodaee[3]**

## Abstract

**Purpose**: The purpose of the present study was to investigate the relationship between self-regulation, self-efficacy and academic performance with the intervention of academic engagement.

**Methodology**: The population of the study consisted of all students at Ferdowsi University of Mashhad in the educational year of 2019-2020. The sample was composed of 367 (141male, 226 female) students. The sampling procedure was done based on the multi-level sampling. The questionnaires contained items on academic engagement, academic self -efficacy and self –regulation questionnaire as well as some basic socio-demographics. In addition, descriptive statistics, correlation and path analysis was used in the assessment of the direct and mediating effects.

**Results:** The results of path analysis indicated that the first observed model did not show good fit indexes. However, the revised model in which some modifications were made, such as removing the path from academic engagement to academic performance, indicated great fit indexes. Based on the revised model, academic engagement completely mediated the relationship between self-efficacy and self-regulation. Moreover, academic engagement and self-regulation partially mediated the relationship between self-efficacy and academic performance. The indirect path from academic engagement to academic achievement mediated by self-regulation was also statistically significant. Self-regulation completely mediates the relationship between academic engagement and academic performance.

**Keywords:** academic performance, academic engagement, academic self-efficacy, self-regulation

## Introduction

Academic performance is one of the important criteria for judging the effectiveness of students' education and deciding on the amount of learning and their ability to complete university education. Numerous and wide-ranging factors affect learning and consequently academic achievement. Identifying these factors can be an effective step in improving learning and solving problems in educational systems.

One of the factors that affect the academic performance of students is "academic engagement". Academic engagement is one of the structures that has attracted increasing attention and is considered as a way to deal with reduced motivation and academic achievement. Academic engagement is a flexible, multifaceted structure in education (Fredricks, Blumenfeld & Paris, 2004) which refers to the level of active participation of learners in educational experiences and activities (Akin, 2009) and connects separate research lines within a single conceptual model (Appleton, Christenson & Reschly, 2006). In other words, it is a "meta construct" that agrees on being multidimensional. Finn (1989) proposed two behavioral and emotional dimensions for academic engagement. In later research, a

[1] MA in Educational Psychology, Ferdowsi University of Mashhad, Iran corresponding author: Email: amirian.kh@gmail.com

[2] MA in Educational Psychology, Bojnourd Branch, Islamic Azad University, Bojnourd, Iran Email: Shirinamani66@gmail.com

[3] Associate Professor of Psychology at Faculty of Education and Psychology, Ferdowsi University of Mashhad, Iran Email: abdkhoda@um.ac.ir

"cognitive" dimension was added. Appleton et al. (2006) considered academic engagement to include two dimensions of cognitive engagement and psychological engagement. Linnenbrink & Pintrich (2003) proposed three dimensions of behavioral, cognitive, and motivational engagement, and finally Reeve (2013) addressed the behavioral, emotional, cognitive, and agentic dimensions. The existence of these last four dimensions was confirmed in the study of Ramezani and Khamesan (2017) in students.

Researchers have pointed to the role of students' cognitive, emotional and behavioral engagements in their academic achievement and decline (Archambault, 2009; Hijzen, Boekaerts & Vedder, 2007; Ghadampour, Mirzaeifar and Sabzian, 2014; Samavi, Javadan and Ebrahimi, 2017).

Another structure related to academic performance is "academic self-efficacy" (Sharma & Nasa, 2014). Self-efficacy is rooted in Bandura's theory of social learning (Bandura, 1997). In the behavioral sciences, self-confidence is called "self-efficacy." Self-efficacy beliefs refer to individuals' perceptions of their ability to successfully influence the environment (Bandura, 2008) or to take action that leads to success (Bandura 1994). Self-efficacy does not mean how much one loves oneself or the task one has to do; rather, it is related to one's belief in how well one can achieve the desired result in a given area (Sharma and NASA, 2014; Bandura, 1997). In other words, academic self-efficacy refers to individuals' beliefs that they are successfully achieving the expected levels of a particular academic task or goal (Bandura, 1997; Leninbrink and Pinrich, 2002). According to Bandura Social Cognitive Theory, self-efficacy beliefs are important in determining the activities that individuals pursue, the amount of effort they put into pursuing activities, and the amount of resilience they show in the face of potential obstacles (Gore, 2006); It is therefore a key factor in academic success (Pajares, 2002).

Several studies have shown that self-efficacy is related to academic performance (Putwain, Sander & Larkin 2013; Chen & Lin, 2009; Multon, Brown & Lent, 1991; Richardson, Abraham & Bond, 2012; Robbins, Lauver, Davis, Langley & Carlstrom, 2004; Jahangard, Lisani, Motahhari Nejad, 2016; Aghdami and Yousefi, 2018; Saffari, Sanai Nasab, Rashidi Jahan, Pournaghi and Pakpour Haj Agha, 2014; Gholam Ali Lavasani, Ejei and Afshari, 2009; Karimzadeh and Mohseni, 2006). The relationship between self-efficacy and academic engagement has also been suggested (Martin, Way, Bobis & Anderson., 2015). Students who are confident in their abilities seem to be more likely to engage in difficult tasks and put in more effort. Students with low levels of self-efficacy, on the other hand, try to avoid such difficult tasks by setting more achievable goals (Wäschle, Allgaier, Lachner, Fink & Nückles, 2014). In this regard, Samavi et al. (2015) showed that; Academic self-efficacy has a positive and significant correlation with cognitive, emotional and behavioral engagement. In Oriol, Lira, Covarrubias & Molina (2017) research, self-efficacy did not have a significant direct effect on academic achievement; but the model in which academic engagement mediated the relationship between self-efficacy and academic achievement and the direct effect of self-efficacy on academic achievement was eliminated had a good fit.

Another concept in the field of learning is the concept of "self-regulation", which has important learning consequences and is one of the goals of educational systems. The essence of the self-regulatory learning theory established by Pintrich and De Groot (1990) is cognitive and metacognitive strategies. Pintrich (1999) believes that; Self-regulated learning includes strategies that students use to adjust their cognitions as well as management strategies that they use to control their learning (Karshki and Mohseni, 2012). Cole, Logan & Walker (2011) define self-regulation as "psychological efforts to control one's inner state, processes, and functions to achieve better goals." Students activate and retain cognitions and emotions related to goals through a self-regulatory process (Zimmerman, 1989).Self-regulated learning strategies emphasize the role of the individual in the learning process to

help the learner actively and continuously, his cognitions, behaviors and efforts to achieve the desired goals (Matuga, 2009). Students who use more self-regulatory strategies, when teaching or studying, teachers try to learn material and improve their academic performance by making the information meaningful, making logical connections with previous information, controlling the process, and creating the right learning environment. In addition to being aware of learning strategies and using them effectively, self-regulated learners also have the ability to maintain and improve their level of motivation to perform academic tasks in complex and difficult or monotonous and boring situations (Wolters, 1998).

Based on the results of several studies, it has been found that there is a positive correlation between self-regulated learning and academic performance (Pourasghar, Kiamanesh and Sarmadi, 2016, Delavar, Ismaili, Hassanvandi and Hassanvand, 2015, Zare, Zeinalipour and Naseri Jahromi, 2017, Yasemi Nejad, Taheri, Golmohammadian and Ahadi, 2013). Zimmerman and Schunk (2008) have stated that; Self-regulatory strategies increase behavioral types of motivation such as homework and reduce behaviors such as procrastination. Researchers have also identified beneficial effects of applying motivational regulation strategies on high school students' learning efforts (Schwinger, Steinmayr, & Spinath, 2009). Klem & Connell (2004) believe that engagement students, in addition to more effort and persistence in academic activities, show more self-regulatory behaviors to achieve their goals. Gholam Ali Lavasani et al. (2013) showed that; Self-regulated learning strategies significantly increase students' academic engagement. Ramezani et al. (2018) also stated that; the direct effect of self-regulation on academic engagement is significant. Another study found that; increasing the use of self-regulatory strategies leads to cognitive and emotional engagement (Azido, 2009). Therefore, according to the statements about the relationship between self-regulation, academic engagement and academic performance, it is hypothesized that self-regulation through academic engagement increases and improves academic performance.

Based on what has been said and the evidence in previous research, there are two-variable correlations between research variables. To comprehensively understand and study multivariate relationships, it is necessary to examine all the mentioned variables with a multivariate approach. The purpose of this study, as shown in Figure 1, is to investigate the mediating role of academic engagement in the relationship between self-regulation and academic self-efficacy with academic performance. Therefore, the hypotheses that the present study seeks to test are: - Academic self-regulation and self-efficacy affect academic performance through academic engagement; - Self-efficacy has a significant direct effect on academic engagement; - Self-regulation has a significant direct effect on academic engagement; - Academic self-efficacy through academic engagement is indirectly related to academic performance; Self-regulation through academic engagement is indirectly related to academic performance.

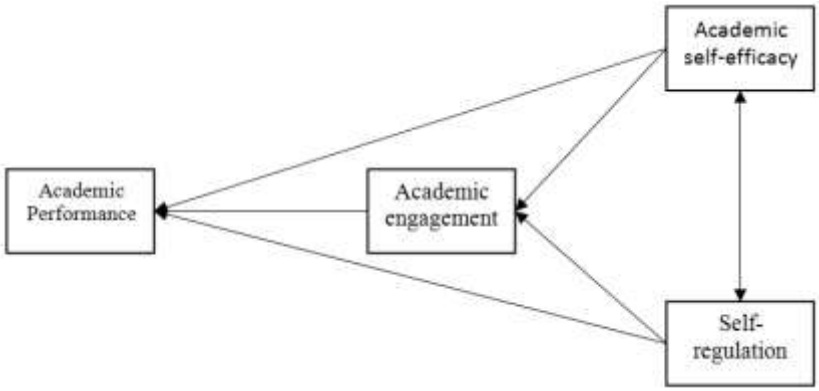


Fig 1. Proposed model of relations of research variables

## Methodology

The present study is in the framework of descriptive correlational research in terms of research method. In this study, the mediating role of academic engagement in the relationship between academic self-efficacy and self-regulation with academic performance in students was investigated by path analysis.

The statistical population includes all undergraduate students of Ferdowsi University of Mashhad who were studying in the academic year 2019-2020. The population size was 12984 (taken from the site of Ferdowsi University of Mashhad) that the sample size of 400 people was determined using Morgan table and considering the possibility of unused of some questionnaires. Excluding incomplete questionnaires, the final subjects were 367 (141 males and 226 females). Given the criterion that the minimum number of samples suitable for performing structural equations is 200 (Kenny and McCouch, 2003) and the criterion that states that for each parameter that is estimated, 10 subjects are needed (Norman and Striner, 2003) the sample size of the present study is suitable for this method.

Research tools include: Academic Engagement Questionnaire: This questionnaire was prepared and compiled by Rio (2013) it has 17 items with four subscales. Self-Regulated Learning Strategies Questionnaire (MSLQ): This questionnaire was developed by Pintrich and De Groot (1990) and has 47 terms, it includes two parts: motivational beliefs and self-regulated learning strategies. Academic Self-Efficacy Beliefs Questionnaire (ASEBQ): This scale was developed by Zajacova, Lynch & Espenshade (2005). In this scale, the concept of academic self-efficacy beliefs is measured by 27 questions in the form of four subscales. For descriptive analysis, spss22 software and path analysis of Amos 22 software were used.

## Results

In the model of path analysis, academic self-efficacy and self-regulation of exogenous variables, academic engagement of the mediating variable and academic performance of the endogenous variable were considered. Before testing the path analysis model, descriptive indicators including mean, standard deviation and indicators of normality and appropriateness of the data were examined, the results of which are presented in Table 1.

Table 1. Descriptive indicators of research variables

| Components | Mean | Standard deviation | Skewness | Critical Skewness value | Elongation | Critical amount of elongation |
|---|---|---|---|---|---|---|
| Academic self-efficacy | 6.58 | 1.79 | -0.48 | -3.778 | -0.18 | -0.721 |
| Self-regulatory | 3.61 | 0.60 | -0.75 | -5.884 | 0.35 | 1.372 |
| Academic engagement | 4.87 | 1.11 | -0.51 | -3.951 | 0.94 | 3.669 |
| Average of all courses | 16.13 | 1.87 | -0.18 | -1.375 | -0.80 | -3.096 |

Because multivariate normality tests are limited in large samples and are found to be abnormal with a small deviation, often only one variable normality is the criterion. Therefore, if the skewness coefficient is in the appropriate range and the data is not skewed too much, they are considered normal (Klein, 2015). Therefore, according to the coefficients of skewness and elongation presented in Table 1, the data can be assumed to have a normal distribution.

Table 2. Correlation matrix of research variables

| Component | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| 1. Academic self-efficacy | 1 | | | |
| 2- Self-regulation | 0.35** | 1 | | |
| 3. Academic Engagement | 0.49** | 0.61** | 1 | |
| 4- Academic performance | 0.28** | 0.25** | 0.24** | 1 |

** Significance level 0.01

The correlation matrix of research variables is presented in Table 2. As can be seen, the two variables of academic self-efficacy and self-regulation with coefficients of r = 0.28 and r = 0.25 are related to academic performance, both of which are significant at the level of 0.01. Also, academic engagement with a correlation coefficient of r = 24 has a significant positive relationship with academic performance. The variables of self-regulation, academic self-efficacy and academic engagement also have a significant positive relationship with each other.

The result of path analysis showed that,

The proposed research model did not have an acceptable fit and despite the fact that academic engagement alone has a significant correlation with academic performance; When placed in the model with academic self-efficacy and self-regulation, the beta coefficient of the path of academic engagement to academic performance is not significant;

In other words, the main hypothesis of the research that stated: "Academic self-regulation and self-efficacy affect academic performance through academic engagement." was rejected. So other models were tested. The final model, which had favorable conditions both in terms of explanation and fit, is shown in Figure 2. As can be seen, in the revised model, since academic engagement alone served as a mediator between the relationship between academic self-efficacy and academic performance but with the introduction of self-regulation into the model, the beta coefficient of academic engagement to academic performance became insignificant. It was hypothesized that the indirect effect of self-efficacy on academic performance is exerted through the path of academic engagement and self-regulation. Therefore, academic engagement and self-regulation were considered as mediators of the relationship between academic self-efficacy and academic performance.

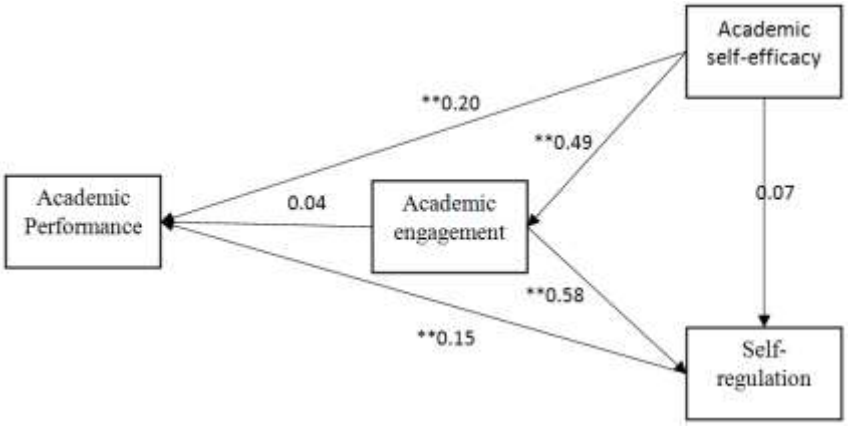


Figure 2. Revised research model

The result of the path analysis test of the revised model (Figure 2) is reported in Table 3. The RMSEA value is less than 0.01, which indicates that the mean squared of the pattern errors is appropriate. Also, some K-square is less than three degrees of freedom. The GFI, AGFI, CFI and NFI indices are higher than 0.95. Therefore, all indicators show excellent model fit.

Table 3. Fit indicators of the modified research model

| Indicator | Description | Acceptable amount | The value obtained of the model |
|---|---|---|---|
| X2/df | Relative K-square | Less than 3 | 0.93 |
| GFI | Adjusted fit index | Greater than 0.9 | 0.99 |
| AGFI | Modified fit index | Greater than 0.9 | 0.98 |
| CFI | Comparative fit index | Greater than 0.9 | 0.99 |
| NFI | Soft fit index | Greater than 0.9 | 0.99 |
| RMR | The root of the mean squared | Less than 0.1 | 0.023 |
| RMSEA | The root of the mean power of the approximation error | Less than 0.1 | <0.01 |

Table 4. Statistical characteristic of regression coefficient of research variables in the revised model

| independent variable | The dependent variable | Non-standard coefficient | Standard error | Standard coefficient | Test statistics | Significance level |
|---|---|---|---|---|---|---|
| | | B | S.E | β | T | P |
| Academic self-efficacy | Academic Performance | 0.232 | 0.055 | 0.20 | 4.193 | 0.001 |
| Academic self-efficacy | Academic engagement | 0.304 | 0.028 | 0.49 | 10.805 | 0.001 |
| Academic self-efficacy | Self-regulatory | 0.023 | 0.016 | 0.07 | 1.465 | 0.143 |
| Academic engagement | Self-regulatory | 0.311 | 0.026 | 0.58 | 12.150 | 0.001 |
| Academic engagement | Academic Performance | 0.110 | 0.105 | 0.06 | 1.041 | 0.298 |
| Self-regulation | Academic Performance | 0.461 | 0.165 | 0.15 | 2.794 | 0.005 |

Table 4 lists the standardized and non-standardized beta coefficients in the modified model and the significance test for each. As can be seen, all coefficients except the coefficient of the path of academic self-efficacy to self-regulation and academic engagement to academic performance are significant at the level of 0.01 confidences. Thus, self-efficacy has a significant direct relationship with academic performance and a significant direct relationship with academic engagement. Academic engagement has a significant positive relationship with self-regulation. Self-regulation also has a significant positive relationship on academic performance. But the direct relationship between academic engagement and academic performance is not significant. Also, the direct relationship between self-efficacy and self-regulation is not significant.

Table 5. Mediation test based on revised research model

| independent variable | Mediator | Dependent variable | Full effect | Direct effect coefficient | Indirect effect factor | Result |
|---|---|---|---|---|---|---|

| | | | | | | |
|---|---|---|---|---|---|---|
| Academic self-efficacy | Academic engagement | Self-regulation | 0.35** | 0.07 | 0.28** | Complete mediation |
| Academic self-efficacy | Academic engagement | Academic Performance | 0.28** | 0.20** | 0.08* | Partial mediation |
| Academic engagement | Self-regulation | Academic Performance | 0.14** | 0.06 | 0.08* | Complete mediation |

The bootstraping method was used for the mediation test, the results of which are reported in Table 5. As can be seen, the indirect path coefficient of self-efficacy to self-regulation mediated by academic engagement with 99% confidence is significant. Also, with the mediation of the direct relationship between academic self-efficacy and self-regulation is not significant; thus, academic engagement completely mediates the relationship between self-efficacy and self-regulation.

The indirect relationship between academic self-efficacy and academic performance through academic engagement and self-regulation is also significant with 95% confidence. At the same time, with the mediator entering, the direct relationship between self-efficacy and academic performance is still significant. Thus, academic engagement and self-regulation mediate the relationship between self-efficacy and academic performance in detail. The indirect relationship between academic engagement and academic performance with self-regulatory mediation is also significant with 95% confidence. With the entry of the mediator variable, there is no direct relationship between the two meaningful variables. Thus, self-regulation fully mediates the relationship between academic engagement and academic performance.

## Conclusion

The aim of this study was to investigate the relationship between academic self-efficacy and self-regulation with academic performance mediated by academic engagement in students. For this purpose, the proposed model was tested with Amos software and path analysis method. Indicators showed that the proposed model does not fit, therefore, a modified model was proposed in which the direct path of academic engagement to academic performance was eliminated and academic engagement and self-regulation were considered as mediators of the relationship between self-efficacy and academic performance. When the variables of academic self-efficacy and self-regulation and academic engagement are included in a model as predictors of academic performance, the direct path coefficient of academic engagement to academic performance is not significant; therefore, academic engagement cannot mediate the relationship between academic self-efficacy and self-regulation with academic performance.

Considering that the direct path coefficient of academic engagement to academic performance is not significant, it was hypothesized that the effect of academic engagement on academic performance is due to other variables in the study. It was shown by testing different models and fitting the modified model; Self-regulation fully mediates the relationship between academic engagement and academic performance. Academic engagement and self-regulation also mediate the relationship between self-efficacy and academic performance. In addition, academic engagement fully mediates the relationship between self-efficacy and self-regulation. Other results showed that academic self-efficacy is a significant predictor of academic engagement and academic engagement is a significant predictor of self-regulation.

This conclusion that academic self-efficacy predicts academic engagement is consistent with the research of Gene et al. (2017), Karimi (2017), Lavasani et al. (2009) and Ismaili Ashini et al. (2017). In this regard, it can be argued that; Students with higher levels of self-efficacy show more effort and perseverance, they are more eager to do homework and projects, they are more motivated to learn, they feel less anxious and stressed, and ultimately have higher academic engagement.

The mediating role of self-regulation in the relationship between academic engagement and academic performance seems to engagement with studies that consider self-regulation as a precursor to academic engagement. Including Ramezani et al. (2018) who showed; Self-regulation mediates the relationship between perceived teacher support and academic engagement. Also the research of Gholam Ali Lavasani et al. (2013) and Azido (2009) who showed; Self-regulatory education leads to increased academic engagement. Studies that have concluded that self-regulation is the result of academic engagement argue that; People with self-regulatory skills exhibit behaviors that involve a higher rate of engagement types. But it is possible that the direction of this relationship is opposite or two-way and the increase of each leads to the increase of the other. As Cabbage and Connell (2004) believe: Engagement students, in addition to more effort and persistence in academic activities, show more self-regulatory behaviors to achieve their goals. The conclusion reached in the present study is that the effect of engagement on performance is through self-regulation.

Another result of the present study is the confirmation of the role of academic self-efficacy in predicting self-regulation. Although this finding is consistent with other studies that point to the role of academic self-efficacy in predicting self-regulation, including Shaykh al-Islami et al. (2015). But the present study showed that this effect is mediated by academic engagement.

It is concluded that academic self-efficacy is a positive and significant predictor of students' academic performance, with the results of several studies (Putin et al., 2013; Peng, 2012; Shaykh al-Islami et al. 2015; Chen and Lin, 2009; Saffari et al. 2013) is consistent. In addition, as noted, the indirect path of self-efficacy to academic performance through academic engagement and self-regulation was also significant. This result agrees with some of the results of the research of Oriel, Cavarbias and Molina (2017) in which self-efficacy did not have a significant direct effect on academic achievement; but the model in which academic conflict mediated the relationship between self-efficacy and academic achievement and the direct effect of self-efficacy on academic achievement was eliminated had a good fit. Also agrees with the result of Shaykh al-Islami et al. (2015) that showed; Self-regulated learning plays a mediating role in the relationship between academic self-efficacy and students' academic achievement. Therefore, the new finding of the present study is that with the inclusion of academic conflict in the model, the direct relationship between academic self-efficacy and self-regulation is not significant and its effect on self-efficacy is exerted through academic engagement.

Regarding the direct and indirect effect of academic self-efficacy on students' academic performance, it can be stated that, when students are confident in their ability to do homework in and out of the classroom, interact appropriately with classmates, students, and other college staff, and manage their other activities on campus and in the family, they become more involved in their academic activities cognitively, behaviorally, emotionally And this engagement in academic activities, in turn, leads to greater use of cognitive and metacognitive self-regulation strategies and resource management, which ultimately leads to better academic performance.

One of the limitations of the present study is its cross-sectional nature. Therefore, caution should be exercised in considering the findings. If longitudinal studies are performed at all levels of education at the university, we can have a better understanding of research variables, their relationships, and the impact they have on academic performance. Another limitation of

the study was the use of a self-report questionnaire. Especially in relation to academic performance, the use of official sources of information can help the accuracy of the findings. Also, interventional research based on the findings of the present study can be another step in identifying the relationships of research variables.

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