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# A Causal Relationship Model of Self-regulated learning and future orientation: The Mediating Role of academic Self-Efficacy and task Value among Masters of Medical education (virtual) in Shahid Beheshti University of Medical Sciences.

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## Abstract

**Background & Objective:** This study aimed to present a causal model of future orientation and self-regulated learning based on the mediating role of academic self-efficacy and task value using a path analysis method.

**Materials and Methods:** This descriptive, correlational study was performed on 205 MSc medical students (MSc) in Shahid Beheshti University, who were selected by Cochrane's formula and multistage stratified sampling. The subjects completed four questionnaires, including Bouffard educational self-regulation questionnaire, Pintrich's task value questionnaire, Midgley's standard self-efficacy questionnaire, and Seginer future orientation questionnaire. Data analysis was performed in SPSS and AMOS using path analysis method.

**Results:** In this study, future orientation factor had a significant, positive effect on academic self-regulation in students. In addition, there was a significant, positive correlation between developmental assessment and students' use of academic self-efficacy and task value, thereby confirming the research hypotheses.

**Conclusion:** According to the results, using future orientation increased academic self-regulation in the MSc medical students (virtual) in Shahid Beheshti University and led to a higher use of academic self-regulation in learning considering the mediating role of academic self-efficacy and task value. Evaluation of the fit indexes demonstrated the favorable fit of the proposed model based on the data obtained from the participants.

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## Introduction

Management of a person in the learning perspective, in the knowledge-based society in 2020 by science and technology researchers, is considered as having access to appropriate knowledge with the right device at the right time and place. Due to the high speed of science production in the world, the old methods in teaching and learning have lost their effectiveness. Therefore, in such an age, there is a need for an independent and motivated learner who tries to master new subjects and homework with self-regulatory strategies by using new educational methods, including virtual education (1).

Accordingly, to provide educational justice, universities and higher education institutions have established virtual training courses. On the other hand, by the pervasiveness of virtual education, regarding the quality of academic achievement for learners of the courses, concerns by education researchers are expanding daily and conducting research to manage education and improve the academic performance in the learners of virtual training courses is important. Today, motivational variables are considered as the most important variables affecting the learning, success, and academic achievement for virtual and non-virtual students; and they have gained the attentions of many experts in the field of education. Hence, in the age, there is a need for an independent and motivated learner who tries to master new content and homework with self-regulatory strategies by using new methods (1). Generally, self-regulatory learning is the ability of an individual to develop knowledge, skills, and behaviors that could be transferred from one context to another, as well as from learning situations to work and leisure settings. The structure has started a debate about the reform of education around the world (2).

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Academic self-efficacy is one of the motivational variables affecting self-regulated learning. Self-efficacy is the judgment of one's ability to succeed in a particular area, or in other words, the extent to which one perseveres and endures to gain experience in a particular area of affairs (3). The effect of academic self-efficacy on self-regulation has been investigated in different ways. The more the use of self-regulated learning strategies, the better the development of people's knowledge about those strategies, the more self-efficacy in using these strategies, the perceived usefulness of their results (4-5). The results lead to useful and attractive interpretations in performing academic tasks (6). Another variable that affects self-regulated learning is the task value, which is learners' interpretations of the usefulness and attractiveness for the task (7). Self-regulated learners choose aims for a specific task and use appropriate strategies to achieve the aims, and actively control important aspects of cognition, behavior, and environment to achieve their own learning aims (8, 5), which leads to a high quality of individual performance (5). Future orientation is another new variable in educational management. Future orientation refers to the individual's mental perception of the future and provides a platform for goal setting and planning, exploring choices, and creating commitment, as guiding the individual's evolutionary path (9). It can facilitate future planning and pave the way for one's progress (10) and a necessary precondition for achieving specific personal goals according to learners' belief in success is the voluntary search for future choices, the exchange of information, and regular planning for the future (11). It also includes the value of assignments to achieve their future goals and plans and the amount of intrinsic value (12).

Focus of the research is on students of virtual courses, it should be noted that Linnenbrink and Pekrun believe that systematic and theoretical research is necessary to gain comprehensive knowledge about the dimensions of virtual learning (13). Therefore, according to the The statistical population for the study consisted of all master students in medical education (virtual) of Shahid Beheshti University of Medical Sciences in the academic year 2018-19 (449

theoretical framework and background of the mentioned researches, the study, using path analysis method, seeks to explain the learning-self-regulation of medical (virtual) students in Shahid Beheshti University of Medical Sciences in Tehran.

According to the results and reports, the main issue in the study is to investigate and clarify the relationships between motivational variables and cognitive variables, and their effects in the form of a model on self-regulation for postgraduate students of Shahid Beheshti University of Medical Sciences. The best way to describe the relationship between a set of interconnected variables is by means of the means of a causal path model.

Hence, considering the importance of learning management in e-learning by the learner, not doing any research in the past with the arrangement, the derived model from the theoretical background and previous research as a conceptual model (Figure 1) is selected and the coefficients are estimated and finally the model is fitted after evaluating the relationships between variables.

The conceptual model of the research is presented in Figure (1).

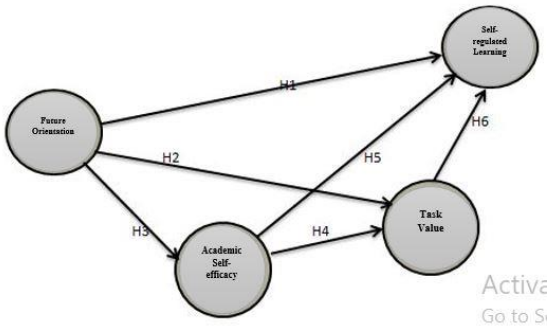


Fig. 1: The conceptual model and hypotheses of research

## Research Method

This research is a descriptive correlation according to the nature of the research and the variables examining method.

people). The study sample (205 people) was selected based on Morgan table by multi-stage stratified sampling method (first, a number were selected from the list of courses offered during the semester, then, at the time of the final exam, a number of tests were selected, and then people randomly completed a number of questionnaires).

To study and measure the variables, questionnaire has been prepared consisting of four standard questionnaires for participants. The questionnaire consisted of six items. Areas of study include task value, self-regulation, self-efficacy, education, and future (career) orientation: The questionnaire scale was as follows in the range of five Likert (1-5 degrees). The questionnaire reliability of this was determined by confirmatory factor analysis using GFI = 0.99, AGFI = 0.94 and RMSEA = 0.05. It showed that the correlation coefficient between the questions was appropriate and professors and experts in this field confirmed its validity. The minimum score for the questionnaire is 45 and the maximum is 225. The questionnaires include:

1. Bouffard Self-Regulatory Questionnaire: Contains 14 items designed by Bouffard et al. (17). All questions are in a 5-point continuum using the Likert scale. The overall reliability coefficient of the questionnaire was 71% based on Cronbach's alpha. The reliability of the cognitive strategies subscale is 70%, and the metacognitive subscale is 68%. The minimum score for the questionnaire is 14 and the maximum is 70.

2. Pintrich Assignment Value Questionnaire: The scale has six items that are set in the five Likert range. The reliability coefficient for the scale in the study of Pintrich et al. (18) was equal to 0.90. The minimum score for the questionnaire is 6 and the maximum is 30.

3. Standard Academic Self-Efficacy Questionnaire by Midgley et al.: The scale has five items with a five-point Likert scale. ethical principles have been observed in all cases, including the informed consent of the candidates Cronbach's alpha for the data before and after the experimental operation was 0.91 and 0.90, respectively (19). In the study, the reliability of using Cronbach's alpha was 0.86 for the academic self-efficacy scale. Face and content validity was examined using the opinions of experts and specialists to evaluate the validity of the tool. The minimum score for the questionnaire is 5 and the maximum is 25.

4- Future Life Path Questionnaire: The questionnaire is prepared with 20 items based on a five-point Likert scale. The questionnaire is used to measure three components of future orientation, which include motivational component, cognitive representation and behavioral component and evaluates the two areas of "work and occupation" and "marriage and family". The assessment of work and occupation has been investigated in the present study. The value for the validity coefficient based on Cronbach's alpha coefficient was 0.72, 0.91, and 0.85, respectively for behavioral, motivational, and cognitive components. To evaluate the validity, by performing factor analysis of the inclined rotation method, these three factors together explained about 38% of the variance (22). The minimum score for the questionnaire is 20 and the maximum is 100.

According to the normal distribution of data, Amos, Lisrel, and SPSS21 software (IBM, Armonk, NY, USA) were used to analyze the data from descriptive statistics (mean, standard deviation, skewness, and elongation). They were also used for inferential statistics (path analysis and Pearson correlation coefficient); and to examine the relationship between research variables and test hypotheses in the form of a Causal-comparative model based on theoretical and experimental background.

It should be noted that to conduct research, the ethics ID received from the ethics committee in biomedical research (IR.PNU.REC.1397.049) and

as well as the rights of the authors, study design, etc.

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## Results

The sample for the present study included 205 students of medical education (virtual) in the master's degree in Shahid Beheshti University of Medical Sciences, the mean and standard deviation of each of the variables are presented in the following table:

**Table 1: Mean and standard deviations of variables**

| Variable | Average | The standard deviation | Skewness | Kurtosis |
|---|---|---|---|---|
| Future orientation | 169.45 | 9.78 | -0.89 | -1.66 |
| Academic Self-Efficacy | 12.06 | 2.42 | 0.47 | 0.09 |
| Task Value | 10.27 | 1.77 | -0.06 | 0.28 |
| Self-regulated learning | 44.30 | 3.19 | 0.38 | -0.05 |

The aim of the study was to investigate the mediating and predictive role of variables and to determine the extent of direct and indirect effects of these variables with each other by-path analysis, so the direct effects of research variables on each other are presented in Table 2.

**Table 2: Characteristics of goodness of fit index in academic self-regulation prediction model of the students.**

| Characteristic | Estimates |
|---|---|
| Chi-square ratio to degree of freedom(x2/df) | 2.06 |
| Comparative fit index(CFI) | 0.98 |
| Goodness of fit index(GFI) | 0.97 |
| Adjusted goodness of fit index(AGFI) | 0.96 |
| Root Mean Square Error of Approximation (RMSEA) | 0.052 |

According to the characteristics about goodness of fit reported in Table 2, the fit of the self-regulatory forecasting model is at a relatively good level and the conceptual model presented in terms of goodness of fit model indices provides a suitable framework for self-regulatory study.

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**Table 3: Estimates of direct and indirect effect coefficients (Combined course at MSc Medical Students (Virtual) in Shahid Beheshti University)**

| | Estimates of direct effect coefficients | | Estimates of indirect effect coefficients | |
|---|---|---|---|---|
| Standardized parameters | Standardized parameters | t | Standardized parameters | t |
| Direct effect of future orientation on: | | | | |
| academic Self-Efficacy: | 0.26** | 3.48 | | |
| task Value | 0.26** | 5.02 | | |
| Self-regulated learning | 0.17** | 2.09 | 0.24** | 8.51 |
| Direct effect of academic Self-Efficacy on: | | | | |
| task Value | 0.29** | 3.95 | | |
| Self-regulated learning | 0.21** | 3.222.75 | 0.24** | 12..60 |
| Direct effect of task Value on: | | | | |
| Self-regulated learning | 0.26** | 3.47 | | |

According to the direct effect coefficients in Table 3, the most important results obtained according to the conceptual model of the research, in postgraduate students of medical education (virtual) of Shahid Beheshti University of Medical Sciences, they are significant for direct effect of future orientation on academic self-efficacy, direct effect of future orientation on homework value. And also for the direct effect of future orientation on academic self-regulation, the direct effect of academic self-efficacy on academic self-regulation, the direct effect of academic self-efficacy on homework value and the direct effect of homework value on academic self-regulation.

Regarding the study of hypotheses, they are approved according to the obtained results and path coefficients between variables according to the conceptual model and the relationship between variables and the level of significance of each variable according to the amount of t obtained and in the table at the level of 0.05 and 0.01 identified by star sign.

According to the indirect effect coefficients, the most important results obtained according to the conceptual model of the research in postgraduate students of medical education (virtual) of Shahid Beheshti University of Medical Sciences, the indirect effect of future orientation on academic self-regulation was 0.24, which was significant and confirmed according to (t = 8.51) at the level of 0.01. In addition, the indirect effect of self-efficacy-education on self-regulation-education is equal to 0.34 which is significant according to (t = 12.60) at the level of 0.01 and both of them have been confirmed.

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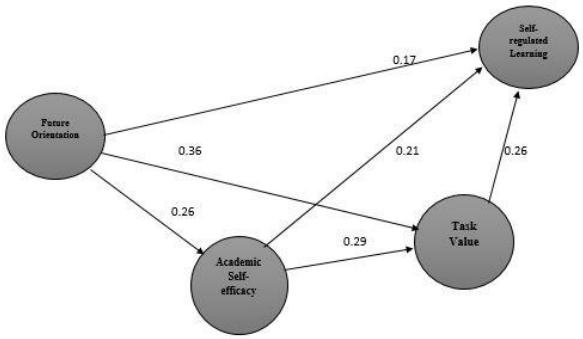


**Fig. 2: Output model for MSc Medical Students (Virtual) in Shahid Beheshti University.**

## Discussion

The aim of the current study is to provide a causal model for future orientation and self-regulation learning with the mediating role of self-efficacy, education and homework value among graduate students in medical education (virtual) Shahid Beheshti University of Medical Sciences. By evaluating of the research conceptual model and according to the indicators for goodness of fit and in the study of the whole model in the study group, the mentioned model has a good fit in terms of indicators and can be used in decisions and policies and is in line with theoretical and empirical foundations.

The results showed that the direct effect of future orientation in students on the value of homework is confirmed, which is consistent with the research of JuJoo et al. (12). Future orientation shows the people tendency to engage in thinking about the future with learners' interpretations of the usefulness and attractiveness of the task. It prepares highly motivated individuals to achieve goals when combined with the perceived degree of importance and usefulness of the task as a driver for interaction in academic activities. Findings are also confirmed in relation to the direct effect of future orientation on academic self-regulation in students. It could be explained that self-regulating individuals regulate their activities and creativity in order to increase and facilitate their creative thinking and long-term goals based on its affirmation. The pervasive role also plays a role in organizing input information and guiding a wide range of behaviors (14).

The results showed that the direct effect of academic self-efficacy on homework value is confirmed, which is consistent with the research of J. Prast et al. (6). It is inferred the value of the task as a strong motivator motivates the person to do something. Students will be more motivated to learn and put more effort and perseverance, if they believe that what they are learning is useful and important, and accept their self-efficacy. The results also showed that the direct effect of task value on academic self-regulation is significant. Students have demonstrated the value of academic homework as one of the strongest endogenous components for deep self-regulation effectiveness and as a driver for interaction in academic activities.

The results also showed that the direct effect of future orientation on academic self-efficacy is significant, which is consistent with the research of Azizli et al. (11). As self-efficacy beliefs do not occur by chance, and successes reinforce self-efficacy beliefs, therefore orientation of future career plans to influence students 'attitudes and beliefs of self-efficacy in students' scientific subjects (15). . The results showed that the direct effect of academic self-efficacy on self-regulation in students is confirmed, which is in line with the research of Cho et al. (4) and by Charlton (5). It can be explained that according to Bandura (16), self-regulation is considered to be dependent on an important motivational variable. In his view, self-efficacy beliefs are judgments about one's ability to organize and perform tasks and his self-regulatory function improves in various ways, if a person has a high sense of self-efficacy in a task. The results showed that the direct effect of academic self-efficacy on students' homework value is significant, which is consistent with the research of J. Prast et al. (6). Students will be more motivated to learn and put more effort and perseverance, if they believe that what they are learning is useful and important, and accept their self-efficacy. The results also showed that the

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direct effect of task value is significant on academic self-regulation. Students have demonstrated the value of academic homework as one of the strongest endogenous components for deep self-regulatory effectiveness and as a driver for interaction in academic activities. The results also show that the direct effect of homework value on students' academic self-regulation is confirmed, which is in line with Charlton's research (5). It can be explained that self-regulatory skills are related to and influenced by task-value activities based on its confirmation.

Findings showed that future orientation has an indirect effect on academic self-regulation. In other words, orientation, academic future through self-efficacy, academic value and homework value have a positive and significant effect on academic self-regulation. This result means that the more students persevere in their academic duties, the more performance they will experience that will make them feel highly self-sufficient. That is the reason to perform better in later situations. Students who are optimistic about the future have high expectations of their mental and physical abilities, in which case they have a high motivation for progress and the lowest level of frustration, and they value their homework. Another important result of this study showed that academic self-efficacy has an indirect effect on academic self-regulation through task-value mediation. Students will be more committed to their studies and more willing to spend time and effort on their homework and study, if they are more willing to do their homework. Due to their greater orientation and motivation, students have more capacity and ability to perform cognitive operations in a task and do not want to end their academic problems regarding the ready structures. They will be critical in their efforts to carry out their academic duties. Based on the hypothesis confirmation, it can be stated that perceived constructivist learning environments, are closely related to inclusive self-efficacy for both directly and indirectly through future orientation, task value, and attitude toward the educational subject (17). Learners, psychologists, counselors, and teachers need to consider the role of future orientation in the development of students' self-efficacy careers to achieve a brighter future (18) and affect future orientation for future career plans, students 'attitudes, and self-efficacy beliefs in students' scientific subjects (15).

## Conclusion

The study investigated the comparison between the direct and indirect effects of research variables on each other in medical education (virtual) students of Shahid Beheshti University of Medical Sciences. . The amount of variance explained for value of homework is 0.20, self-efficacy education is 0.17, and learning self-regulation education is 0.46. Comparison of the explained variance showed that the effect of self-efficacy variable has the greatest effect on self-regulatory learning strategies. The findings of the study showed that the greatest overall effect on academic self-regulation is related to the self-efficacy-academic variable for the master students of medical education (virtual) of Shahid Beheshti University of Medical Sciences.

It can be concluded that students use academic self-efficacy for their abilities, achieve good results, and solve problems related to different fields of study. The more people are willing to do their academic duties, the more likely they are to commit to education and the more willing they are to spend time and effort on their homework and study. Hence, they show more efficiency and persistence in dealing with academic issues and problems.

A lot of research is needed to confirm the findings, and more research that is extensive is needed on other key variables affecting self-regulatory learning so that committed and responsible students be educated for a precise and creative scientific community. However, in the study, access to students was difficult; more research can examine the expansion of the range of effects of different factors on self-regulation.

Conditions should be provided to guide students in a way that can benefit from specific

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strategies to achieve their higher goals about the growing importance of management in individual and virtual education. To this end, to provide courses for teaching self-regulated learning strategies, it is suggested to those involved in education and learning, while providing a suitable platform for the growth of the positive effects of these variables.

This research is the result of a Ph.D. Thesis. It is hoped that in education the results will be used well.

Best Regards,

Great thanks to the esteemed Dean of the Faculty of Management and Medical Education in Shahid Beheshti University of Medical Sciences and all the students cooperated in the research.

**Conflicts of Interest:** The authors declare that there are no conflicts of interest.

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