



## The Mediating Role of Learning Emotions in Relation to Learning Approaches with Academic Engagement

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### Abstract

Learning emotions consist of a range of ups and downs students come across in the classroom concerning the subject of study that may affect their performance in academic affairs and the correlation between learning approaches and academic engagement. The present study discussed the mediating role of learning emotions in the relationship between learning approaches and academic engagement in the academic year 2020/2021. The study used a correlation-descriptive research method and multistage cluster sampling. Participants were 384 female upper-secondary school students according to the Cochran formula. Three types of questionnaires were used to collect data: Reeve and Tseng's academic engagement, Miller et al's learning approaches, and Pekrun's learning emotions. Data were analyzed using Structural Equation Modelling in PLS software. Our findings showed that learning emotions (both positive and negative) have a mediating role in the correlation between learning approaches (learning goals, performance goals, instrumental/future goals, perception ability, external and internal evaluation) and academic engagement ( $P \leq 0/05$ ). Moreover, learning approaches have a significant positive correlation with academic engagement ( $P \leq 0/05$ ). Furthermore, learning approaches have a significant positive correlation with positive learning emotions, but a significant negative correlation with negative learning emotions ( $P \leq 0/05$ ). We can hereby deduce that positive emotions have a significant positive correlation with academic engagement ( $P \leq 0/05$ ), whereas the correlation coefficient between negative learning emotions and academic engagement is not significant ( $P \geq 0/05$ ). It can be concluded that academic engagement is significantly affected by learning approaches and learning emotions and positive emotions increase the effect of learning approaches on academic learning.

**Keywords:** Academic Engagement, Learning Approaches, Learning Emotion

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### Introduction

The success of any educational organization and institute is largely dependent on the quality of their graduates who are trained as labor force. In this regard, academic engagement plays an important role in cognitive, emotional and social development of a

teenage student (Dong, Wang, Zhu, Li, & Fang, 2020). Academic engagement refers to cognitive, behavioral and emotional engagement of a student with education (Sharma, 2019). Academic engagement is one of the most important indicators of the quality and efficiency of an education system and academic success of

learners which was first applied to understand and explain the academic failure. Marx, Simonsen, and Kitchel (2016) defined academic engagement as a holistic engagement in academic activities and believed that such psychological process includes attention, interest and attempt that a learner shows to learn. Reviewing the new research has shown that academic engagement is a multifaceted concept comprising of behavioral, scientific, psychological and cognitive components (Reeve & Tseng, 2011). Moreover, academic engagement determines to a large degree the academic performance and academic success of learners and motivates them and helps in better retention of instruction and effective learning (Jaafar, Hashim, & Ariffin, 2012). However, it is still unknown which factors have a direct relationship with academic engagement and with what type of mechanism this relationship comply. Although, the role of academic engagement in improving scientific success of students substantiated (Kigwilu & Munyae, 2020), there is still research gap regarding the factors that might help improving the academic engagement.

According to ecological systems theory (Bronfenbrenner & Morris, 1998), the origin of any change emanates from complicated and progressing interactive relationships between active growing bio psychological organism(learner) and individuals, objects and symbols (teachers, classmates, learning tasks and objectives) in neighboring environments (such as academic micro systems, schools and universities). Thus based on such theory, it can be concluded that one of the factors which paves the way for more change and increase the academic engagement of students is learning approaches. Also, researchers have proved in the past recent years that learning approaches is a basis for academic development of students (Coertjens, Vanthournout, Lindblom-Ylänne, & Postareff, 2016; Galla et al., 2014; Hu, Zhou, Chen, Fan, & Winsler, 2017).

Learning approach is defined as a set of general skills comprising of curiosity, perseverance, planning and interaction in cooperative learning (Bustamante, White, & Greenfield, 2017). Learning approaches is in fact a term used to show how learners interact with class subjects. The term learning approaches refers to different motives and their pertaining approaches which students apply while making different decisions in regard to their studies (Senemoglu, 2011; Valadas, Gonçalves, & Faísca, 2010; Yonker, 2011).

In this regard, findings by Herrmann, Bager-Elsborg, and McCune (2017); Mohamadamin Bahrami (2017); as well as those of Olpak and Korucu (2016) have indicated that learning approaches may affect academic engagement and deep learning approaches can lead to

students engagement and generate more enthusiasm among students. The results of a research conducted by Asheghi (2017) have shown that learning styles have a positive effect on academic engagement. Panayiotou, Humphrey, and Wigelsworth (2019) have shown that academic engagement can ameliorate effective learning. Also, Mohamadamin Bahrami (2017) demonstrated that students who adopt preferred learning approaches are different when their academic engagement compared. According to the research carried out, it can be expected that academic engagement is explained based on the learning approaches.

On the other hand, learning occurs in different intricate and complicated layers and emotion is one of its most important modulators in forming memory. The ability to conceptualize and perceive an individual's emotional responses, has turned into a popular discourse in experimental domain (Wright, Riedel, Sechrest, Lane, & Smith, 2018). This research domain creates many emotional and cognitive theoretical models about learning emotions (Barrett, 2017; Kleckner et al., 2017; Smith, Sanova, Alkozei, Lane, & Killgore, 2018).

By academic emotion, we mean any emotion directly related with success activities (such as enjoyment, boredom, and angry with accomplishing homework) or the results of academic success (such as pride, anxiety or shame) (Pekrun, Goetz, Titz, & Perry, 2002).

Strictly speaking, in Pekrun's Value- Control Theory, academic emotions are classified according to three types of values: negative versus positive emotions, pleasant versus unpleasant emotions and activated and inactivated and (subject of activity versus consequence) (Pekrun, 2006). Students not only acquire knowledge and cognitive skills but also develop their pleasant and unpleasant emotions related to learning and emotions (Ben-Eliyahu, 2019). However, students' emotions are considered positive when they fulfill the educational and training goals (Smith & Lane, 2016). Academic emotions can affect students' academic engagement according to Value-Control Theory (Pekrun, Goetz, Daniels, Stupnisky, & Perry, 2010). In this regard, Al-Hendawi (2012) has suggested that academic engagement can be a good predictor for more engagement and enthusiasm among students, specifically, emotional interactions students nurture in class can affect academic engagement and finally on their success at school (Reyes, Brackett, Rivers, White, & Salovey, 2012). Results of a research conducted by Harrington, Trevino, Lopez, and Giuliani (2020) have indicated that learning emotions affect academic success performance directly or indirectly. Findings of a research carried out by Mohammadi Siah Kamari (2017) have shown that academic engagement and positive

academic emotions can predict autonomous learning among students. In addition, Martínez, Youssef-Morgan, Chambel, and Marques-Pinto (2019) have suggested that students who have high degree of academic engagement probably experienced high levels of psychological resource.

According to a research conducted by Tabatabayee Seyed Mousa (2019), it was indicated that there is a meaningful relationship between academic emotions and academic engagement among students. According to the current research and theories such as Pekrun's Value-control Theory, it is expected that academic emotions may predict academic engagement among students.

Regarding the relationship between academic emotions and learning approaches, the results of a research conducted by Mostafayee Ali (2019) have indicated that there is a positive relationship between positive emotions such as joy, hope, pride, with a deep approach while there is a negative relationship between negative emotions such as anger, anxiety, shame, despair, boredom with a deep approach. The results of a research conducted by Rentzios, Kamtsios, and Karagiannopoulou (2019) have suggested that there is a negative relationship between negative emotions and learning approaches, whereas there is a positive relationship between learning emotions and learning approaches. According to the research mentioned, it is expected that learning approaches and academic emotions interact with each other.

To sum up, it can be argued that improving academic engagement among students is the key to improve educational outputs (Payne, 2020), since the main reason for academic failure and decreasing students' success is due to the fact that students have a rather lackadaisical approach toward education and refraining from engaging in academic issues (Vetter, Schreiner, McIntosh, & Dugan, 2019), and the more a learner engage in academic and learning issues, the more hopeful he/she will become about academic success and dealing with academic failure (Begaye, 2019). It is worth mentioning that effective learning requires emotion, and individuals use their intuitions to lead their decisions and thoughts. These intuitions, combine emotional responses with cognitive processes and connect them with what have learnt from experience so that enthusiasm and academic engagement among students will be developed (Smith, Lane, Parr, & Friston, 2019). More importantly, where positive emotions combine with suitable approaches, they will result in positive outcomes such as more academic engagement and in total improving academic success. However, since the results of current research and theories have not directly study the relationship of these variables in a model simultaneously

and thus the effectiveness mechanism of these variables on each other has not been proved clear, the current study aimed at identifying and filling the research gap.

On the other hand, due to existence of evidence regarding the role of academic engagement in relationship with academic success, the causes and reasons for creating such a phenomenon and defining the prominent role of cognitive factors such as academic emotions are inevitably necessary. The quality and efficiency of an education system and academic success of learners can increase through understanding and optimizing factors that may help improve the academic engagement among students. Moreover, this study aimed at concentrating on the role of learning emotions, which might pave the way for improving the academic success of learners.

The results of this research also deepens our understanding of students' motivation and learning emotions in many ways. The current research may aid educational managers, leaders, policy makers, teachers and decision makers to better understand and analyze academic and educational issues of students.

Since the effect of learning approaches on academic learning is caused by some cognitive and motivational mediating mechanisms and one of these mechanisms is positive and negative academic emotions, this study seems beneficial. Moreover, in order to understand the current situation better regarding the approaches applied, and to make suitable decision in order to use suitable approach in learning and how to make connection between different approaches with academic engagement, this type of research is essential. Also, considering the fact that in the experimental research conducted before, it was not clear how learning emotions transfer the relationship between learning approaches with academic engagement, and whether these emotions which are affected by learning approaches have the ability to predict academic engagement among students or not, this matters were taken into consideration. Therefore, the current study aimed at testing this hypothesis to probe if there a relationship exists between learning approaches and academic engagement considering the mediating role of learning emotions or not.

## Method

### Design

To carry out current study, the applied model and correlational research design was used. The current research is one of the applied researches while considering the aim of the research.

## Participants

The statistical population included 3681 female students studying at public junior high schools in Mahabad. Cochran formula was applied to determine the sample size; therefore, the sample was 348 subjects to generalize the results of the research to all statistical population. In the current research, 348 sound and complete questionnaires were collected. Multi-stage cluster sampling method was applied as our sampling method, the first clusters are schools, where some schools selected from among different schools, and some classes according to their academic levels were selected randomly in each school. And finally, some students were randomly selected in each class.

## Instruments

In the current research, Reeve and Tseng (2011) questionnaire was used. It is comprised of 32 questions (behavioral engagement questions (eight questions)), emotional engagement (8 questions), cognitive engagement (7 questions), and Factor engagement (9 questions) measured using five-level Likert scaling (1: Completely disagree, 2: disagree, 3: Neither agree or disagree, 4: agree, 5: completely agree). Maximum score considered for an academic engagement is 160 and minimum 32 and a score of 80 is considered as an intermediary score for academic engagement. The validity of the questionnaire was established according to results of factor analysis and load factor and average variance extracted. Reliability of the dimensions of the questionnaire was calculated using Cronbach's Alpha Test for behavioral engagement (0.83), factor engagement (0.79), Cognitive engagement (0.84), emotional engagement (0.81) and academic engagement (0.89).

Also, achievement emotion questionnaire designed by Pekrun et al. (2002) was used consisting of 232 items, of which 75 items are learning items that measure positive and negative emotions. This questionnaire consists of a five-level Likert scaling (never to always) and each item has a value of 1 to 5, measuring Learning emotions. Items 1 to 22 are positive emotions (for example: I enjoy acquiring new knowledge), and items 23 to 75 for negative emotions (for example: studying makes me angry). Maximum and minimum scores for positive emotions are 22 to 110 and for negative emotions are 53 to 265. Pekrun et al. (2002) assessed the reliability of the questionnaire by asking the professional opinion of experts and professors in the field of education and psychology.

Abdollahpour Mohammad Azad (2014) studied the reliability of the learning emotions questionnaire among 317 Iranian students and confirmed the results. The

results of the research conducted by Pekrun et al. (2002) have indicated that academic emotion questionnaire have acceptable internal consistency reliability and the Cronbach's alpha coefficients for subscales were evaluated to be between 0.74 to 0.86. Also, the reliability of the questionnaire for positive emotions evaluated as 0.94 and 0.94 and for negative emotions 0.97 and 0.91, respectively.

The Learning Approaches Questionnaire of Miller, DeBacker, and Greene (1999) has 32 questions and its purpose is to evaluate learning approaches (learning goals, function goals, future/ instrumental goals, perception of ability, internal and external evaluation). This questionnaire is designed according to five-level Likert Scaling (Completely disagree (1), disagree (2), have no idea (3), agree (4), completely agree (5)). The internal consistency coefficients (Cronbach's alpha) for subscales of learning goals, performance goals, future / instrumental goals, perception of ability, internal evaluation, and external evaluation are 0.84, 0.90, 0.91, 0.90, 0.84, 0.89 respectively. In the research of Sedaghat (2010), Internal consistency coefficient (Cronbach's alpha) for mediated subscales was assessed after factor analysis and subscale factor coefficient evaluation. All subscales have high levels of validity ranging from 0.82 to 0.93 which is similar to marking report in a study conducted by Miller et al. (1999). Hardré and Sullivan (2008) confirmed the validity of scaling in different cultures and samples using factor analysis. The results of factor analysis indicated that factor loads on markers on latent variable is between 0.58 and 0.88. Correlation coefficient between performance goals and perception ability is 0.24, between perception ability and learning goals is 0.64, and between future goals and performance goals is 0.49, for future learning goals is 0.81 and for performance goals equals to 0.33 and for perception ability and future goals 0.60 was reported (Sedaghat, 2010).

## Procedure

The questionnaires were distributed among the subjects electronically on SHAD website due to outbreak of pandemic Covid-19 and since the subjects were not physically available. In this method, the questionnaires were first designed online and the link was sent to different schools and classes. It is worth mentioning that the questionnaires were distributed among principals, vice-principals and teachers via Shad website and after obtaining permission from the Department of Education, the respondents were asked to complete the questionnaires honestly and assured them that all their answers were kept confidential and would merely be referred to in the research. Finally, after the completion

of the desired questionnaires, the distribution of them stopped and research data were analyzed. To analyze the data collected, modelling of structural equations was used in PLS software.

## Findings

According to the data collected, 73 students participated in the study were 16 years old (21%), 182 students were 17 years old (52%), and 93 students were 18 years old

(18%). Considering their academic levels, 71 students were studying in the tenth grade (18%), 153 students were studying in the eleventh grade (44%), and 124 students were in the twelfth grade (36%). In the following Table, mean, minimum, maximum and standard deviation and Kolmogorov-Smirnov test are studied. The details of statistical analysis are reflected in the Tables as follows:

**Table 1.**  
*Descriptive Indices of Research Variables*

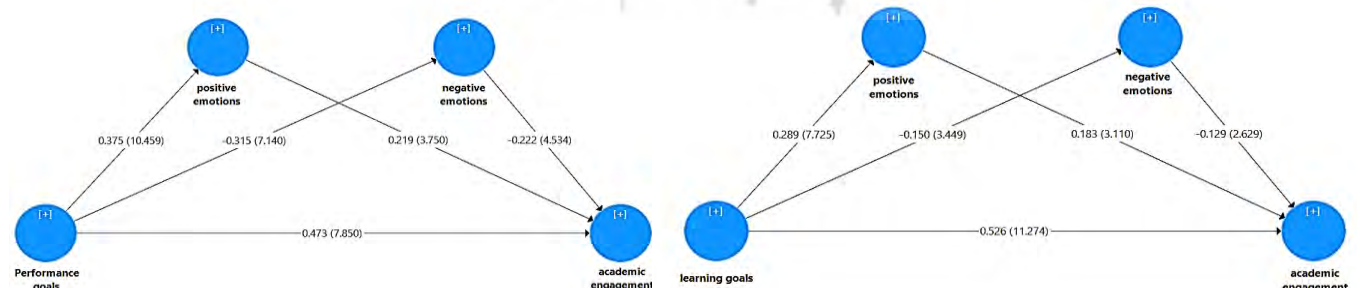
	Average	Minimum	Maximum	Standard deviation	Significant level of Kolmogorov-Smirnov test	Cronbach's alpha coefficient
<b>Academic engagement</b>	108.761	95	117	5.323	.000	0.843
<b>Learning approaches</b>	19.273	9	25	3.773	.000	0.887
<b>Performance goals</b>	24.784	16	30	3.367	.000	0.860
<b>Future/ instrumental goals</b>	21.747	17	25	2.53	.000	0.818
<b>Perception of ability</b>	21.578	11	25	3.526	.000	0.818
<b>Internal evaluation</b>	21.046	8	25	3.453	.000	0.797
<b>External evaluation</b>	25.477	4	30	4.978	.000	0.733
<b>Positive emotions</b>	92.405	64	109	11.901	.000	0.805
<b>Negative emotions</b>	103.425	55	169	29.423	.000	0.856

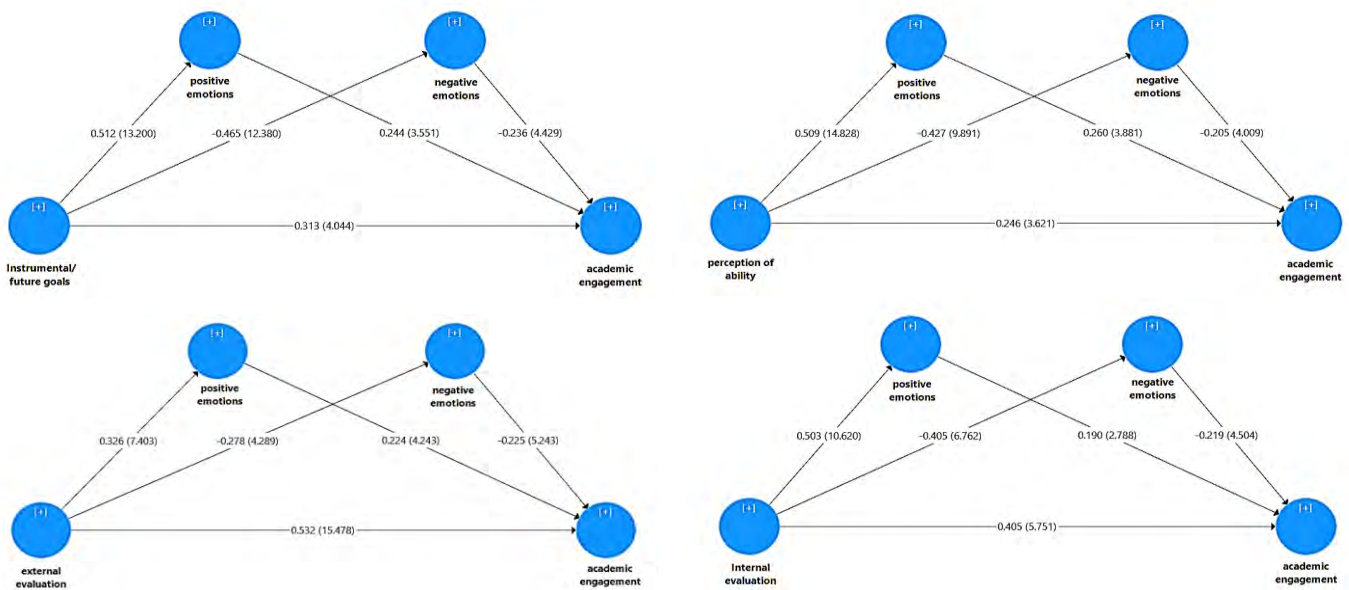
The Kolmogorov-Smirnov test results have indicated that the significant level for each variable was  $\geq 0.5$ . Therefore, it can be claimed that the data were not distributed normally. Since the theoretical model for our research is so complicated i.e. latent variables of the

second grade and more existed in our research model, so the most suitable software for analyzing the normal data is PLS software. In the following tables, the models used in PLS software are presented.

**Figure 1.**

*The Results of the Role of Intermediary of Positive and Negative Emotions In Relation to Learning Approaches and Academic Engagement*





Cronbach's alpha coefficient and combined reliability are used for reliability, and convergent validity and discriminant validity are used to confirm validity. The results showed that Cronbach's alpha and

composite reliability for all items were higher than 0.7 and also the Average Variance Extracted for all routes were higher than 0.4, which indicated that the reliability and validity of the research model were acceptable.

**Table 2.** Composite Reliability and Cronbach's Alpha and Average Variance Extracted (AVE).

	Cronbach's alpha	Composite reliability	Average variance extracted
<b>Perception ability</b>	0.843	0.863	0.671
<b>External evaluation</b>	0.860	0.879	0.683
<b>Future/instrumental goals</b>	0.818	0.892	0.734
<b>Performance goals</b>	0.818	0.878	0.662
<b>Learning goals</b>	0.797	0.832	0.689
<b>Academic engagement</b>	0.733	0.855	0.501
<b>Positive emotions</b>	0.806	0.855	0.501
<b>Negative emotions</b>	0.856	0.888	0.540

Also, to study the discriminant validity, Fornell-Larcker was used. The results of the test indicate that concepts (latent variable) in the model have more relations with their indices than with any other concepts, in other words, the divergent validity of the

model was suitable. The results have indicated the suitable goodness of fit index.

In the following Table, the results of the correlation of each of the variables of our study is defined.

**Table 3.**  
*The Study of Correlation Matrix between Research Variables*

	Perception ability	External evaluation	Internal evaluation	Future/ instrumental goals	Performance goals	Learning goals	Academic engagement	Positive emotions	Negative emotions
<b>Perception ability</b>	1.000								
<b>External evaluation</b>	0.734	1.000							
<b>Internal evaluation</b>	0.797	0.864	1.000						
<b>Future/ instrumental goals</b>	0.705	0.650	0.786	1.000					
<b>Performance goals</b>	0.446	0.569	0.625	0.688	1.000				
<b>Learning goals</b>	0.460	0.568	0.637	0.480	0.691	1.000			
<b>Academic engagement</b>	0.290	0.542	0.412	0.329	0.485	0.560	1.000		
<b>Positive emotions</b>	0.509	0.326	0.503	0.512	0.375	0.289	0.251	1.000	
<b>Negative emotions</b>	-0.427	-0.278	-0.405	-0.456	-0.315	-0.150	-0.069	-0.652	1.000

To study the mediating role, the ratio of indirect impact on total impact (variance accounted for (VAF)) should be analyzed. In order to analyze this hypothesis, direct impact, indirect impact, total impact and variance accounted for (VAF) were studied. To interpret the results of VAF, if the amount of VAF is less than 20%,

it can be concluded that no mediating role has taken place. On the contrary, if the amount of VAF is considerable and more than 80%, it can be claimed that complete mediating role has taken place. Where VAF is between 20% and 80 %, it can be explained as partial mediating role.

**Table 4.**  
*The Results of the Intermediary Role of Negative and Positive Emotions in Relation to Performance Goals and Academic Engagement.*

	Type of impact	Path coefficient	T-value	Significant level
<b>Performance goals ≥ academic engagement</b>	Direct	0.473	7.850	0.000
<b>Performance goals ≥ positive emotion</b>	Direct	0.375	10.459	0.000
<b>Positive emotions ≥ academic engagement</b>	Direct	0.219	3.750	0.000
<b>Performance goals ≥ academic engagement</b>	Indirect	0.133	2.452	0.032
<b>Performance goals ≥ academic engagement</b>	Total	0.606	11.254	0.000
<b>Direct impact+ total impact (positive emotions)</b>	VAF	0/219	VAF ≥ 20%	
<b>Performance goals ≥ academic engagement</b>	direct	0.473	7.850	
<b>Performance goals ≥ negative emotions</b>	direct	-0.315	7.140	
<b>Negative emotions ≥ academic engagement</b>	direct	-0.222	4.534	
<b>Performance goals ≥ academic engagement</b>	Indirect	0.152	2.399	
<b>Performance goals ≥ academic engagement</b>	Total	0.625	10.440	
<b>Indirect impact+ total impact (negative emotions)</b>	VAF	0.24	VAF ≥ 20%	

According to the results, since VAF results for studying the role of positive and negative emotions was calculated as 0.219 and 0.24 respectively and these values were greater than 20%, so it can be concluded

that the mediating role of positive and negative emotions was confirmed in relation of performance goals and academic engagement.

**Table 5.**

*The Results of the Mediating Role of Negative and Positive Emotions in Relation to Performance Goals and Academic Engagement.*

	Type of impact	Path coefficient	T-value	Significant level
Learning goals $\geq$ academic engagement	Direct	0.526	11.274	0.000
Learning goals $\geq$ positive emotions	Direct	0.289	7.725	0.000
Positive emotions $\geq$ academic engagement	Direct	0.183	3.110	0.002
Learning goals $\geq$ academic engagement	Indirect	0.148	1.99	0.042
learning goals $\geq$ academic engagement	Total	0.674	15.140	0.000
<b>Direct impact+ total impact (positive emotions)</b>	VAF	0/22	VAF $\geq$ 20%	
Learning goals $\geq$ academic engagement	direct	0.526	11.274	
Learning goals $\geq$ negative emotions	direct	-0.150	3.449	
Negative emotions $\geq$ academic engagement	direct	-0.129	2.629	
Learning goals $\geq$ academic engagement	Indirect	0.134	2.018	
Learning goals $\geq$ academic engagement	Total	0.660	16.175	
<b>Indirect impact+ total impact (negative emotions)</b>	VAF	0.203	VAF $\geq$ 20%	

According to the results, since VAF results for studying the role of positive and negative emotions was calculated as 0.22 and 0.203 respectively and these values were greater than 20%, so it can be concluded

that the mediating role of positive and negative emotions was confirmed in learning goals and academic engagement relation.

**Table 6.**

*The Results of the Mediating Role of Negative and Positive Emotions in Relation to Future and Instrument Goals and Academic Engagement.*

	Type of impact	Path coefficient	T-value	Significant level
Future /instrument goals $\geq$ academic engagement	Direct	0.313	44.044	0.000
Future /instrument goals $\geq$ positive emotions	Direct	0.512	13.200	0.000
Positive emotions $\geq$ academic engagement	Direct	0.244	3.551	0.000
Future /instrument goals $\geq$ academic engagement	Indirect	0.116	2.356	0.022
Future /instrument goals $\geq$ academic engagement	Total	0.429	6.438	0.000
<b>indirect impact+ total impact (positive emotions)</b>	VAF	0/27	VAF $\geq$ 20%	
Future /instrument goals $\geq$ academic engagement	direct	0.313	4.044	
Future /instrument goals $\geq$ negative emotions	direct	-0.465	12.380	
Negative emotions $\geq$ academic engagement	direct	-0.236	4.429	
Future /instrument goals $\geq$ academic engagement	Indirect	0.125	2.412	
Future /instrument goals $\geq$ academic engagement	Total	0.438	9.758	
<b>Indirect impact+ total impact (negative emotions)</b>	VAF	0.28	VAF $\geq$ 20%	

According to the results, since VAF results for studying the role of positive and negative emotions was calculated as 0.27 and 0.28 respectively and these values were greater than 20%, so it can be concluded

that the mediating role of positive and negative emotions was confirmed in Future /instrument goals  $\geq$  and academic engagement relation.



**Table 7.**

*The Results of the Mediating Role of Negative and Positive Emotions in Relation to Perception of Ability and Academic Engagement.*

	Type of impact	Path coefficient	T-value	Significant level
Perception of ability $\geq$ academic engagement	Direct	0.246	3.621	0.000
Perception of ability $\geq$ positive emotions	Direct	0.509	14.828	0.000
Positive emotions $\geq$ academic engagement	Direct	0.260	3.881	0.000
Perception of ability $\geq$ academic engagement	Indirect	0.145	3.118	0.014
Perception of ability $\geq$ academic engagement	Total	0.390	8.583	0.000
indirect impact+ total impact (positive emotions)	VAF	0/37	VAF $\geq$ 20%	
Perception of ability $\geq$ academic engagement	direct	0.246	3.621	
Perception of ability $\geq$ negative emotions	direct	-0.427	9.891	
Negative emotions $\geq$ academic engagement	direct	-0.205	4.009	
Perception of ability $\geq$ academic engagement	Indirect	0.152	3.722	
Perception of ability $\geq$ academic engagement	Total	0.408	7.624	
Indirect impact+ total impact (negative emotions)	VAF	0.372	VAF $\geq$ 20%	

According to the results, since VAF results for studying the role of positive and negative emotions was calculated as 0.37 and 0.372 respectively and these values were greater than 20%, thus, it can be concluded

that the mediating role of positive and negative emotions was confirmed in Perception of ability  $\geq$  and academic engagement relation.

**Table 8.**

*The Results Of The Mediating Role of Negative and Positive Emotions in Relation to Internal Evaluation and Academic Engagement.*

	Type of impact	Path coefficient	T-value	Significant level
Internal evaluation $\geq$ academic engagement	Direct	0.405	5.751	0.000
Internal evaluation $\geq$ positive emotions	Direct	0.503	10.620	0.000
Positive emotions $\geq$ academic engagement	Direct	0.190	2.788	0.005
Internal evaluation $\geq$ academic engagement	Indirect	0.129	2.499	0.031
Internal evaluation $\geq$ academic engagement	Total	0.534	10.844	0.000
indirect impact+ total impact (positive emotions)	VAF	0/24	VAF $\geq$ 20%	
Internal evaluation $\geq$ academic engagement	direct	0.405	5.751	
Internal evaluation $\geq$ negative emotions	direct	-0.405	6.762	
Negative emotions $\geq$ academic engagement	direct	-0.219	4.504	
Internal evaluation $\geq$ academic engagement	Indirect	0.117	2.001	
Internal evaluation $\geq$ academic engagement	Total	0.522	10.791	
Indirect impact+ total impact (negative emotions)	VAF	0.224	VAF $\geq$ 20%	

According to the results, since VAF results for studying the role of positive and negative emotions was calculated as 0.24 and 0.224 respectively and these values were greater than 20%, so it can be concluded

that the mediating role of positive and negative emotions was confirmed in internal evaluation  $\geq$  and academic engagement relation.

**Table 9.**

*The Results of the Mediating Role of Negative and Positive Emotions in Relation to External Evaluation and Academic Engagement.*

	Type of impact	Path coefficient	T-value	Significant level
<b>external evaluation <math>\geq</math> academic engagement</b>	Direct	0.532	15.478	0.000
<b>External evaluation <math>\geq</math> positive emotions</b>	Direct	0.326	7.403	0.000
<b>Positive emotions <math>\geq</math> academic engagement</b>	Direct	0.224	4.243	0.005
<b>external evaluation <math>\geq</math> academic engagement</b>	Indirect	0.134	1.971	0.044
<b>External evaluation <math>\geq</math> academic engagement</b>	Total	0.666	15.791	0.000
<b>indirect impact+ total impact (positive emotions)</b>	VAF	0/21	VAF $\geq$ 20%	
<b>external evaluation <math>\geq</math> academic engagement</b>	direct	0.532	15.478	
<b>External evaluation <math>\geq</math> negative emotions</b>	direct	-0.278	4.289	
<b>Negative emotions <math>\geq</math> academic engagement</b>	direct	-0.225	5.243	
<b>External evaluation <math>\geq</math> academic engagement</b>	Indirect	0.161	3.499	
<b>External evaluation <math>\geq</math> academic engagement</b>	Total	0.693	14.420	
<b>Indirect impact+ total impact (negative emotions)</b>	VAF	0/23	VAF $\geq$ 20%	

According to the results, since VAF results for studying the role of positive and negative emotions was calculated as 0.21 and 0.23 respectively and these values were greater than 20%, so it can be concluded that the mediating role of positive and negative emotions was confirmed in external evaluation  $\geq$  and academic engagement relation.

## Discussion

According to the data collected in the current study, learning emotions play a mediating role in academic engagement in the learning approaches equation which confirms the hypothesis in this study. To justify the results collected, we can allege that learning occurs in many complicated layers, where, emotion is one of the most important modifiers in molding memory. Students not only acquire knowledge and cognitive skills during formal instruction but also develop pleasant and unpleasant emotion. Rentzios et al. (2019) have found a positive relationship between learning emotions and learning approaches. According Pekrun's control-value theory, academic emotions can affect academic engagement among students. Machumu and Zhu (2019) have indicated a significant relationship between learning approaches and academic engagement. Also, deep learning approaches predict a positive academic engagement and superficial learning approaches predict a negative academic engagement. Rucinski, Brown, and Downer (2018) have found that the quality of teacher-pupil relationship and emotional atmosphere of class as well as the social emotions of students depend on emotional-social development of students and their academic engagement.

Carmona-Halty, Schaufeli, Llorens, and Salanova (2019) studied the relationship between positive emotions and academic performance and mediating role of cognitive capital and academic engagement in a case study in Chile, where 497 high school students participated. The results have indicated that promotion of positive feelings among students have become a challenge among principals, teachers and parents who tried to create scientific psychological capital and exchange information and knowledge which in turn culminates a better scientific performance. In this regard, Al-Hendawi (2012) has found that academic emotions can be good predictors for academic engagement and academic eagerness among students, in other words, emotional relations which students develop in class can affect their academic engagement and finally affect their success in school. Effective learning requires emotions to be completed and individuals use their intuition to guide their thoughts and decisions. These intuitions combine emotional responses with cognitive processes and connect them to what students have already learned by experience in order to develop academic eagerness and academic engagement among students.

According to the results collected from analysis of data among female upper-secondary school students of Mahabad, it was found that learning approaches have a correlation with academic engagement. The results are compatible with those conducted by Asheghi (2017), Mohamadamin Bahrami (2017), and Zerang (2012). The studies conducted regarding the relationship between learning approaches and academic engagement have produced different results. The research conducted by Tanwir (2010) has indicated that there is a correlation between learning approaches and academic engagement.

Specifically speaking, evidence has suggested that there is a positive correlation between deep learning approaches and academic engagement; on the other hand, no correlation between superficial learning approaches and academic engagement has been reported yet. Marx et al. (2016) have confirmed that there exists a negative correlation between superficial learning approaches and academic engagement but in other studies, they found no significant correlation between superficial learning approaches and academic engagement.

On the other hand, researches have indicated that ideal quality learning among university students has a significantly positive correlation with deep learning approaches but has no correlation with superficial learning approaches. The results of a study conducted by Minbashian, Huon, and Bird (2004) have indicated that the quality of answers student give on exams has a positive correlation with deep learning approaches but has no relationship with superficial learning approaches. Since learning styles and academic engagement have motivating power, therefore, it is expected that these two variables have interaction with each other. The second reason that seems to correlate with the results of the study is the class atmosphere and teaching methodology, to put it another way, class atmosphere and teaching methodology can engage students more and motivate them to apply different learning styles. According to what has been explained, we can claim that learning style has an effect on the degree of academic engagement of individuals and therefore students can increase their academic success by acquiring learning styles related to different fields of study.

According to the results obtained in this study, learning approaches have a correlation with learning emotions among female upper-secondary school students of Mahabad and these results confirm the results of the research conducted by Mostafayee Ali (2019) and Rentzios et al. (2019). To explain the results, it can be stated that emotions have a correlation with motivation, learning approaches and academic success of students and have an effect on their psychological and physical health. Pekrun (2006) believed that positive academic emotions can facilitate the application of creative and flexible learning approaches such as expansion, organization, critical assessment and metacognitive supervision. Also, Negative academic engagement can facilitate the application of creative and flexible learning approaches such as simple repetition and emphasis on applying algorithm methods. He believed that such effects in activated emotions such as joy, are more significant than in non-activated emotions such as comfort. Emotions such as solace or fatigue cause physiological deactivation or even psychological

deactivation, and as a result, diminish attention and superficial processing of information. The research conducted by Pekrun et al. (2010) has confirmed a significant correlation between academic engagement and autonomous learning approaches regarding the concept of academic emotions and autonomous learning approaches. According to the findings of a research conducted by Pekrun et al. (2010), positive activated emotions such as joy of learning facilitate the application of creative learning approaches, cognitive flexibility in the application of cognitive and metacognitive approaches compatible with the immediate goals and necessary assignments. Negative activated emotions (such as anxiety) facilitate solid approaches such as simple repetition. Moreover, negative activated emotions (such as fatigue) may result in the application of superficial methods of information processing.

The results of the relationship between learning approaches and academic engagement among female upper-secondary school students of Mahabad confirmed the results of researches conducted by Mohammadi Siah Kamari (2017). To explain these findings, we can say that emotions play an important role in nearly all academic and learning processes and can have an effect on learning process and learners' achievements.

## Conclusion

When a student enjoys accomplishing learning activities, she may have more internal motivation compared to what she felt before accomplishing the task and may continue learning with more controllability and attention on learning leading to more academic success. These academic activities result in creation of emotions such as hope, satisfaction and feeling proud of oneself among students. On the other hand, negative activator emotions such as boredom are detrimental to motivation and may result in superficial processing of information and may hinder academic engagement. Some researchers consider hail emotions as important factors explaining the academic success and motivation among students.

There are two important models considering the importance of emotions: Pekrun's Cognitive-motivational model and Linnenbrink and Pentrich's Systematic model (2002). Pekrun's Cognitive-motivational model assumes that emotions have an indirect effect on academic success through cognitive and metacognitive intermediaries and so the most important intermediaries are academic motivation, learning approaches, cognitive and self-regulated resources. Emotions have different effects on academic engagement. Researches have indicated that active positive emotions have a correlation with increased

learning efficiency, on the contrary, inactive and negative emotions have a correlation with decreasing learning rate. Some researchers believe that active positive emotions such as joy, hope and pride have a significant correlation with metacognitive learning approaches such as organization elaboration while negative activator emotions (anger, anxiety and shame) have sometimes correlation with repetition and review approaches.

Teachers and educators are recommended to assign suitable academic activities, motivate their students not by their grades but with their progress, and cater to their emotional needs to be able to provide them with positive emotional feedback on their activities at school and to increase their emotional engagement. Moreover, teachers had better teach students study skills and learning strategies that increase their engagement and prepare them for active participation in education and learning by having everyone speak their mind, talk about their interests, pose their questions, make suggestions, and teach for themselves so that their agentic engagement is improved. To increase academic engagement, students should be taught correct learning styles to implement such learning styles properly.

As for the limitations, the results of the present study suggest that participants, due to the application of self-report tools rather than actual behavioral study, might be tendentious to engage in social desirability bias to avoid incompetence and negative self-concept. It is recommended that teachers study the mediating role of class emotions and exams in the correlation between learning approaches variables and academic engagement. Gender invariance of the existing relationship between the concepts of the research should be tested.

### Conflict of Interests

No conflicts of interest declared.

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