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Development of Structural Model for Prediction of Academic Achievement by Global Self-esteem, Academic Self- concept, Self-regulated Learning Strategies and Autonomous Academic Motivation

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Abstract

The aim of this study was to evaluate the conceptual model of structural equations for prediction of student's academic achievements based on Academic Self- Concept, Autonomous Academic Motivation and Self-Regulated Learning Strategies. Therefore, 417 high school students including 191 female and 226 male were randomly selected in Saghez city Northwest of Iran. All participants responded to Global Self-Esteem Questionnaire, Academic Motivation Scale, Learning Strategies Questionnaire and Self – Concept Questionnaire. The results showed that teaching of the three components of emotional intelligence significantly effected children performance on the test ($p \leq 0/0001, t=9/10$). In this study, female and male children's performances were compared within the experimental group which did not show any significant difference in terms of social development or its dimensions. Administering educational programs with a focus on emotional intelligence and its effects on social development of children is one of the areas that require extensive research across different age groups to maximize instructional approaches. Based on this finding we suggest enhancing emotional intelligence with a view of promoting social skills across different educational levels

Keywords: Academic Achievement , Global self-esteem, Academic self- concept and Autonomous Academic Motivation

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1. Introduction

Academic achievement is one of the most important and challenging concepts in educational psychology. The difference in academic achievement is a function of several factors According to previous reports, the difference in academic performance is not only difference in educational and

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training factors, but it is affected by mental characteristics and differences in a student's life experiences (Bawman, 2003). Many complex and intertwining factors influence academic achievement of learners. Among them social behaviour and learning strategy (Pintrich and Degroth, 1990), academic involvement, parental styles and academic motivation (Gronlick, Deci, Ryan, 2006), academic self-concept (Marsh 2006) and global self-esteem can be mentioned (Wondimu and Bruinsma, 2006). In this research, the effect of four individual factors that affecting academic progress will be reviewed. These factors included: Global self-esteem, Academic self-concept, self-regulate Learning Strategy and Autonomous Academic Motivation.

Self-concept and achievement

Hierarchical theory of Marsh and Shavelson (2006, 1976) is one of the supporting bases of this research. These researchers defined self-concept as "A person's perception of himself Marsh et al believe that (2006) self-concept is not viewed as a single structure, but it is divided into social, physical and academic self-concept structures, in which the global self-concept is on top. Among self-concept dimensions, academic self concept has the highest effect on students' academic achievement (Marsh, 2006 Sanchez and Roda 2003, Shavelson et al, 1976). Academic self concept (students' perception of themselves) is about learning and school activities, so this kind of self-concept is about school's environment (House, 1992 quoted by Rodriguez, 2009, Marsh 2006, Wondimu Ahmad and Brunsma, 2006). Some researches showed that academic self-concept in compression with global self-concept has stronger relationship to academic achievement (Hamacheck, 1995, Marsh 2006). Most of researchers believe that self-concept effective on academic achievement and has a positive relationship with it. (Marsh, Byrn and Yeung, 1992, Marsh and Craven 2006, Wilson 2009, Marsh and Trautwein 2006, Erkman et al, 2010, Ireson and Hallam 2009).

Learning strategy and academic achievement

Self-regulated learning strategy is a tool for the guidance of the students' learning and teachers' teaching style. Pintrich self-regulated pattern (1999) is the basis of this style. This learning model is based on three general classes of strategies: cognitive strategies, self-regulated strategies (meta-cognitive) and resource management strategies. Based on self-regulated learning strategy, when students are been aware of their abilities, they have self-regulation, in other words, they use other strategies and resources to do their actions more effectively, therefore achieve their learning goals. Many researches approved the positive relationship between learning strategy and academic achievement. For further study, refer to Zimmerman and Martines Pons (1990), Wolters (2010), Wolters and Pintrich (1998), Chang (2011) Matuga (2009), Shin and Gamon (2002), Kosinin (2007).

Autonomous academic motivation and academic achievement

Self-determination theory which is a new motivation theory is the origin of a great deal of research, it introduced fundamental principles of stable human motivation (Stone, Deci and Ryan 2008). In this theory, motivation is divided into some types: internal motivation, external motivation and amotivation. (Deci, Ryan 1985, Ryan, Deci 2000). Internal motivation is human's inherent desire to learn and external motivation is trying to reach good results, in fact getting external incentives. External motivation also is divided into few minor components: external regulation, interjected regulated, identified regulation. External motivation has the least degree of autonomy, the actions are doing only for getting award or avoiding punishment. In interjected regulated, one event is exactly internalized and in identified regulation which is more autonomous than other components, the action is accepted as a value (Deci, Ryan 1985, Ryan, Deci 2005, Wondimu Ahmad and Brunsma, 2006). Amotivation people think they

cannot control their behaviour and unpredictable and uncontrollable external factors are the main causes of their behaviour (Deci, and Ryan 1990). Relative autonomous motivation or need for self-determination also are components of this theory and expresses the person's ability to decide independently, people who are in high level of this motivation do not need external control. Stone, Deci, Ryan (2008) stated that self-determination theory is related to many scientific areas such as education and training, especially approved the relationship between autonomous motivation and academic achievement. For further study related to autonomous motivation and academic achievement, refer to Vansteen Kist and others (2005) Guay , Ratelle and Chanal (2008), Gronlick et. al (1991), Guay et.al (2010) , Black and Deci (2000), Ayub (2010), WondimuAhmad and Brunisma, (2006). But some of these researches has not approved the positive relationship between autonomous motivation and academic achievement (see Chung, Chen, Jong Jang 2010, Baker 2004).

The relationships between Global Self-esteem, Academic Self-concept, Learning Strategy and Autonomous Motivation

Several studies have been done regarding the present study's variables. Hein and Hogger (2007) approved the relation between global self-esteem and autonomous motivation, and self-concept and self-esteem. WondimuAhmad and Brunisma, (2006) showed there is a strong relationship between global self-esteem and academic self-concept. Guay et. al (2010) approved reciprocity between academic self-concept and autonomous motivation. Baker (2004) in his study found that people with high internal motivation use study strategy with deeper level. Harris and Graham (1992), Zimmerman and Schunk (1989) approved the relationship between academic self-concept and learning strategy (quoted by Dermitzaki et al 2009).

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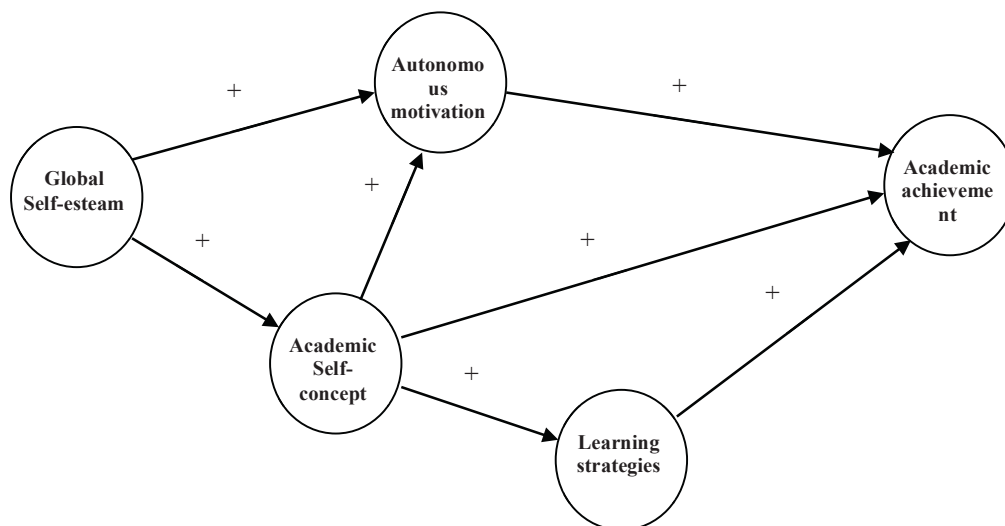


Figure 1: A Concept Model of Global Self-esteem, Academic Self- concept, Learning Strategy, Autonomous Motivation and Academic Achievement.

As seen in the above chart the main aim of this study is indicating which one of the main variables directly and which one indirectly effect on academic achievement of students. The significance of this study is that tries to investigate the effect of these variables on the academic achievement, simultaneously.

2.Methods

2.1.Participants

Four hundred and seventeen (417) first grade students from Saghez high schools (226 boys, 191 girls) responded to the questionnaires,. 54.2% of the sample consisted of boys and 45.8% was girls. All students were full time students of governmental high schools of Saghez city in the academic year of 2009-2010

2.2. Measures

In this research we used four different questionnaires to measure research variables as follows:

Self-concept Inventory

The questionnaire that used to evaluate the academic self- concept was Sara Swat self-concept inventory (Saraswat, 1984). This questionnaire is composed of 48 items. Eight items evaluate academic self-concept; in present study these 8 questions were chosen. Approved analytical factor results showed that two items of these sub-scales have load factor below 0.3, therefore they were omitted. Finally, six items of the self-concept questionnaire were applied in this study. It's reliability was 0.77 by using Cronbach's alpha method.

Academic Motivation scale

Autonomous academic motivation scale (AMS) Vollerand et al (1989) were used to evaluate autonomous academic motivation of students. This scale has 28 items. This questionnaire is made up 7 sub-scales; 3 of them evaluate internal motivation (internal motivation for knowledge, internal motivation for accomplishment, internal motivation for stimulation). The three other sub-scale also evaluate the external motivation (external regulation, interjected regulated and identified regulated), the last scale evaluates no motivation. Also, to evaluate relative autonomous motivation the below formula were used to comply with previous works (Wallrand et.al 2007, Guay et.al 2010, Chung, Chen, Jong Jang 2010, Hein and Hogger 2007):

$$(2 \text{ internal motivation} + \text{identified motivation}) - ((\text{interjected regulated} + \text{external regulation}/2 + 2 \text{ no motivation}))$$

As it can be seen, +2 value is given to internal motivation and +1 is given to identified regulated, because these two variables have great effects on autonomy.-1value is given to the external motivation and interjected motivation because they are factors for controlling motivation.

Finally, -2 value is given to no motivation. Cronbach's alpha for AMS sub-scales has been reported 0.96 in previous studies by Guay et.al(2010), Chung, Chen, Jong Jang(2010) . However, in this study Cronbach's alpha is 0.78.

Learning strategies questionnaire

To evaluate self-regulated learning strategy, the motivation strategies questionnaire for learning were used, which was designed by Pintrich and Degroth (1990). In this study two sub-scales of cognitive strategy application and self-regulation were chosen. Cognitive strategy application sub-scale is composed of 13 items, and self-regulated sub-scale is composed of 9 items. Pintrich and Degroth (1990) reported cronbach's alpha coefficient for cognitive strategy application 0.83 and for self- regulated strategy 0.74, in this study cronbach's alpha coefficient for cognitive strategy application sub-scale was 0.88, for self-regulated strategy 0.85, and for the whole questionnaire was 0.93.

Global Self-esteem scale

Global self-esteem was evaluated by using the Rosenberg Global Self-esteem Scale (1965). This scale has 10 items. In the previous studies, the reliability of this scale was reported to be from 0.72 to 0.88. Results of the factor analysis on this scale showed that its 2 items have factor loads less than 30%, so they were omitted from the final model. The cronbach's alpha of this study was 0.75.

In order to evaluate students' academic achievement, the total grade mean of students in 2009-2010 academic year was obtained. In Iran each academic year in high school has two semesters, in this study the mean of both semesters were used to evaluate students' academic achievement.

3. Results

Correlation matrix of variables and descriptive index were done by SPSS software version 18 and structural equation model tests were done by Amos software version 18.

In table 1, descriptive indexes of models variables are shown.

Table 1: descriptive indexes of models variables

Variable	Mean	SD	SED	Minimum	Maximum
Academic achievement	14.13	3.78	0.18	5.64	19.98
Academic self- concept	22.36	4.74	0.23	12	30
Learning strategies	102.73	24.96	1.22	41	150
Global self-esteem	16.10	4.21	0.20	3	24
Autonomous academic motivation	8.27	3.89	0.19	-10	16

Table 2: correlation coefficient between variables.

	1	2	3	4	5
1- ACH	—				
2- ASC	0.711**	—			
3-LS	0.805**	0.639**	—		
4- GS	0.259**	0.399**	0.317**	—	
5-AUTOM	0.534**	0.515**	0.474**	0.331**	—

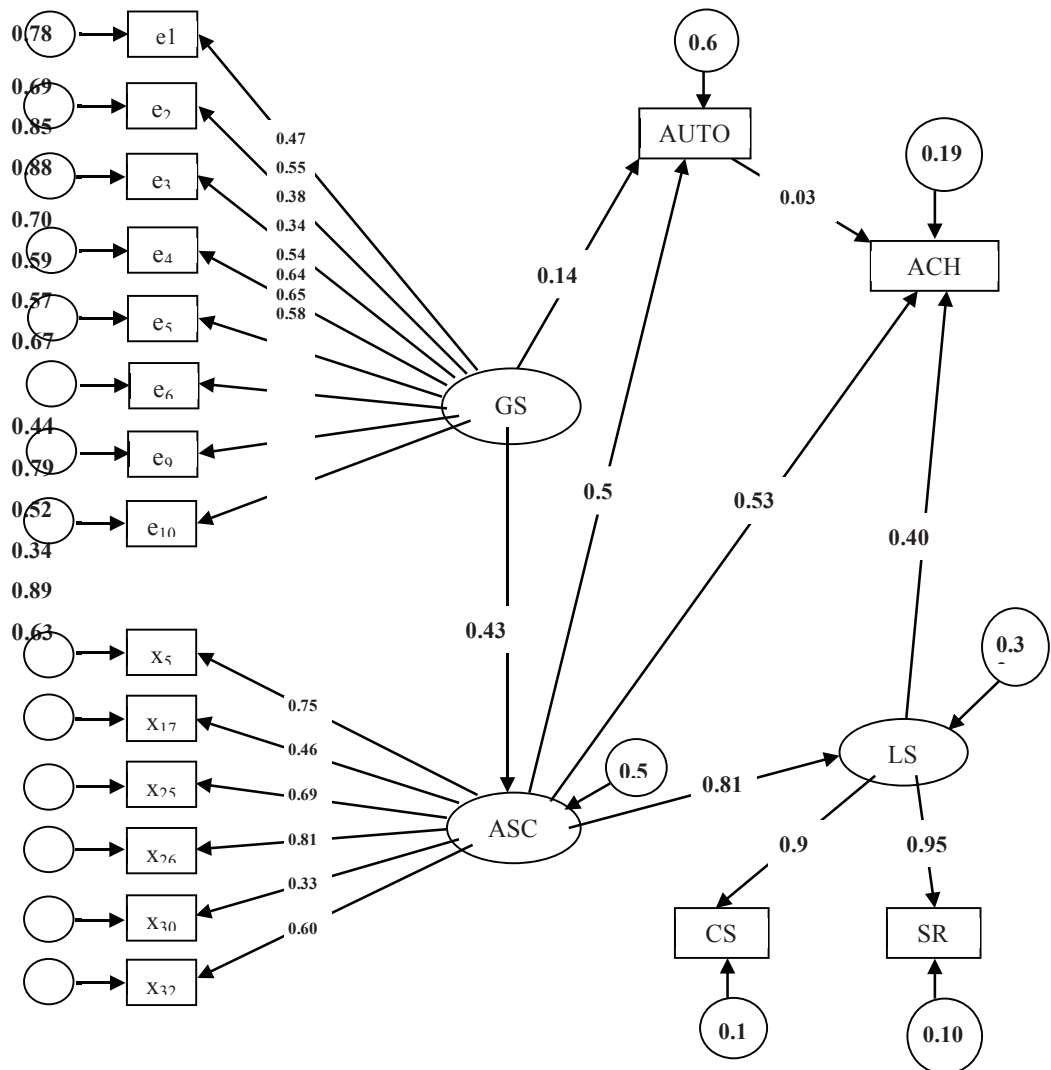
Note : ACH = academic achievement, ASC = academic self- concept, LS = Learning strategies, AUTOM = Autonomous academic motivation, GS = Global self-esteem ,

** P< 0.01.

As it is presented in table 2, all the variables have significant correlation at 0.01 level. The strongest correlation is related to the relationship between learning strategies and academic achievement ($r= 0.78$) and the least correlation is related to self-esteem and academic achievement ($r=0.259$).

The general model of this study is below:

Figure 2: The final model of study



Note : Gs = Global self – esteem; AUTOM = Autonomous academic motivation;
 ASC = Academic self – concept; ACH = Academic achievement; Ls: Learning strategies; CS = cognitive strategies; SR: self-Regulated; S = Items of Global self – esteem; A = Item of academic self – concept.

Table 3: The goodness of fit indices of the structural model

GFI	AGFI	NFI	CFI
0.97	0.929	0.929	0.946

As it is presented in table 3, all the fit indexes are more than 0.90, therefore these indices show that the developed model has a good fit. As it can be seen in table 3, all the fit indices are about 0.90, so these indexes show that the developed model has a good fit. Also, root mean square error of approximation is 0.041, since the value is less than, it is appropriate for this index, so the model is in an acceptable range in terms of this index. The normed chi square or relative chi square is 1.657, as it is between the range of 1 to 3 so it is acceptable, and finally Hottel's index show 0.05 level for a sample size of 297 and 0.01 level for a sample size of 321. As both sample sizes are above 200, the conditions of Hottel's index are fulfilled. According to the aforementioned indexes, it can be concluded that, the model is good.

Table 4: Coefficients of standardized values of direct, indirect and total structural model variables

Through	On	Direct effect	Indirect effect	Total effect
Gs	Asc	0.43**	—	0.43**
Asc	Ls	0.81**	—	0.81**
Ls	AcH	0.40**	—	0.40**
Asc	AcH	0.53**	0.34**	0.87**
AuTom	AcH	0.03	—	0.03
Gs	AcH	—	0.38**	0.38**
Gs	AuTom	0.14**	0.22**	0.36**
Gs	Ls	—	0.35**	0.35**
Asc	AuTom	0.58**	—	0.58**

Note : Gs = Global self – esteem; Asc = Academic self – concept; Ls = Learning strategies; AcH = Academic achievement; AuToM = Autonomous academic motivation. ** $P < 0.001$

As standard coefficient of global self-esteem is significant ($\gamma = 0.43$, $p < 0.01$), global self-esteem has the ability to predict academic self-concept. Also, global self-esteem can indirectly predict academic achievement ($\beta = 0.38$, $p < 0.01$), in other words, self-esteem influences academic achievement via self-

concept. Self-esteem is effective on learning strategy indirectly via academic self-concept ($\beta=0.35$, $p<0.01$). Academic self-concept is significant via relative autonomous motivation ($\beta= 0.5$, $p<0.01$). So academic self-concept structures can predict students' autonomous motivation.

Academic self-concept can be effective on academic achievement directly and indirectly through learning strategy. Direct effect of academic self-concept on academic achievement ($\beta=0.35$, $p<0.01$) and is indirect effect through self-regulated learning strategy ($\beta=0.34$, $p<0.01$) and total effect coefficient $\beta=0.805$, $p<0.01$). Furthermore, direct effect of academic self-concept on self-regulated learning strategy ($\beta=0.81$, $p<0.01$) is positive and significant. Therefore, students' who have high self-concept use more learning strategies and have higher academic achievement.

Self-regulated learning strategy also has direct ability of prediction academic achievement ($\beta=0.040$, $p<0.01$). Autonomous academic motivation effect on academic achievement although is positive but is not significant ($\beta=0.03$, $p<0.01$).

4. Conclusion

The results of this study show that global self-esteem has the ability of self-concept prediction, in other words, those students who have positive belief about themselves feel higher competency in academic fields. These findings are in line with previous studies done by Wondimu Ahmad and Brunnsma,(2006); Cockley (2003); Renolds (1998); Rabinsen (2003).

These findings are similar to those by Wondimu Ahmad and Brunnsma,(2006) model, so self-concept can have the intermediary role between global self-esteem and academic achievement. Global self-esteem predicts academic achievement indirectly through academic self-concept. There is a positive and significant relationship between academic self-concept and academic achievement, self-concept can predict academic achievement directly and indirectly through learning strategies. These findings are in line with those by Guay, Rattle Roy and Litalin (2010); Erkman et.al (2010); Ireson and Halaham (2009); and WondimuAhmad and Brunnsma,(2006), so those students who feel to have higher academic abilities perform more successfully than others in their education. Among remarkable results of the present study, is the high effect of self-concept on learning strategies. Students who believe themselves in academic activities use more learning strategies. This finding is also consistent with several previous studies (such as Dermitzaki et.al 2009, Zimmerman and Schunk 1989).

Academic self-concept has a positive and structural relationship with relative autonomous motivation. In other words, students who feel more competency have higher autonomy, these findings are confirming the results obtained by Wondimu Ahmad and Brunnsma (2006), and Guay, Rattle Roy and Litalin 2010. These results are in line with SDT theory of Deci and Ryan (1985). These researchers stated that if a person has a good perception of himself, he/she will have higher autonomous motivation, especially when he/she has an internal reasoning resource for academic activities.

Self-concept theory (Marsh 2006) also stated that feeling positive about self has many social consequences such as academic achievement and internal motivation. From the results of this study it is concluded that relative autonomous coefficient effect on academic achievement is not significant ($\beta= 0.028$) so it can be said that in this study autonomy could not predict the academic achievement. This finding is different from most of other studies reported before (Vansteenkiste et.al 2005; Guay , Rattle and Chanel 2008; Guay , Rattle ,Roy and Chanel 2010 ; Wondimu Ahmad and Brunnsma, 2006)

Although the results of this study is consistent with some other studies (see Chung Chen and Jung Jang 2010, Baker 2004), in none of the structural models that Chung and Chen (2010) have developed the effect of relative autonomous motivation on academic achievement, or other learning structures such as

perceived learning and course satisfaction was not significant. This indicates the need for a closer examination of eastern pattern of Deci and Ryan (2000, 1985) autonomous theory. Although these researchers claimed that autonomous theory is a universal theory, the results of some studies such as the present one questioned this universality. This finding is in line with those researches, which found that autonomous motivation is related to culture.

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