

# Modeling the Structural Relationship between Epistemological Beliefs Qualities of school life with Academic achievement of Adolescent Students

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## *Abstract*

The aim of this study was to modeling structural relationship between epistemological beliefs qualities of school life with academic achievement. Correlation research was based on the structural equation modeling technique, specifically regression equations (combining path analysis and factor analysis of the second level). The statistical population consisted of all boys of the first year of secondary high school in Babol. In this study, 310 students were selected as sample size using multistage cluster sampling method. Data gathering tools, Shomor's epistemological beliefs questionnaire, school life quality questionnaire and average score of students as a measure of academic achievement were used. The findings showed that the research model was confirmed and, in general, 49% of academic achievement can be explained by epistemological beliefs, school quality of life, and academic procrastination. Also, the variables of epistemological beliefs have direct effects on the academic achievement. Epistemological beliefs with mediating the quality of school life show an indirect effect on academic achievement. The results of this study emphasized the necessity of the role of learners' beliefs and behaviors in relation to interactive quality with educational systems, which can provide applied concepts for improving academic achievement to counselors and learners.

**Keywords:** Academic Achievement, Epistemological Beliefs, Students, Quality of Life.

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## 1. Introduction

Academic achievements represent performance outcomes that indicate the extent to which a person has accomplished specific goals that were the focus of activities in instructional environments, specifically in school, college, and university. School systems mostly define cognitive goals that either apply across multiple subject areas (e.g., critical thinking) or include the acquisition of knowledge and understanding in a specific intellectual domain (e.g., numeracy, literacy, science, history). (Gunuc, & Kuzu, 2015). Therefore, academic achievement should be considered to be a multifaceted construct that comprises different domains of learning. Because the field of academic achievement is very wide-ranging and covers a broad variety of educational outcomes, the definition of academic achievement depends on the indicators used to measure it. Among the many criteria that indicate academic achievement, there are very general indicators such as procedural and declarative knowledge acquired in an educational system, more curricular-based criteria such as grades or performance on an educational achievement test, and cumulative indicators of academic achievement such as educational degrees and certificates (Hofer, 2000). All criteria have in common that they represent intellectual endeavors and thus, more or less, mirror the intellectual capacity of a person. In the developed societies, academic achievement plays an important role in every person's life (Kardash, & Scholes, 1996). Academic achievement as measured by the GPA (grade point average) or by standardized assessments designed for selection purpose such as the SAT (Scholastic Assessment Test) determines whether a student will have the opportunity to continue his or her education (e.g., to attend a university). Therefore, academic achievement defines whether one can take part in higher education, and based on the educational degrees one attains, influences one's vocational career after education. Besides the relevance for an individual, academic achievement is of utmost importance for the wealth of a nation and its prosperity. The strong association between a society's level of academic achievement and positive socioeconomic development is one reason for conducting international studies on academic achievement, such as PISA (Programme for International Student Assessment), administered by the OECD (Organisation for Economic Co-operation and Development). The results of these studies provide information about different indicators of a nation's academic achievement; such information is used to analyze the strengths and weaknesses of a nation's educational system and to guide educational

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policy decisions (Ravindran, Green, DeBaker, 2000; Simons, Dewitte, lens, 2004). Given the individual and societal importance of academic achievement, it is not surprising that academic achievement is the research focus of many scientists; for example, in psychology or educational disciplines. This article focuses on the explanation, determination, enhancement, and assessment of academic achievement as investigated by educational psychologists.

Epistemology is defined as a discipline investigating, researching and inquiring the nature, source, borders, accuracy, reliability and validity of knowledge and ways of acquiring and transferring it (Ekinici, 2017). With this content, epistemology contributes to the construction of viewpoints concerning the definition, formation and learning of knowledge and at the same time, enables the evaluation of the viewpoints possessed by individuals.

As a result of the experiences and interactions individuals undergo, they reach some permanent conceptions and beliefs about knowledge and its acquisition. These conceptions and beliefs make up an individual's epistemological beliefs. Schommer (1990) argues that epistemological beliefs have a scope going beyond the beliefs related to knowledge because they also cover the beliefs concerning learning and learning aptitude related to the processes of acquisition and use of knowledge and all of these should be regarded as a belief system. Individuals' belief levels regarding the dimensions of epistemological beliefs might be different from each other. For instance, while an individual thinks that knowledge has a simple and fixed structure, he/she might believe, on the other hand, that knowledge has a quite complex structure encompassing different ideas (Päuler Kuppinger, & Jucks, 2017).

The quality of school life has been highlighted as an important aspect of schooling by a number of authors (e.g. Ainley & Sheret, 1992; Bryk & Holland, 1993; Flynn, 1993; Delors, 1996; Ainley, 1999; Anderson & Bourke, 2000). To these authors, the purpose of schooling is more than the transmission of knowledge or the development of learning skills. Instead, the central aim of education is, as expressed by Bryk et al. (1993, p. 289), "the formation . . . of each student as a person-in-community . . . and the basic disposition for citizenship in a democratic and pluralistic society". From this perspective, students learn in school the socially-acceptable language and behavior, the etiquette in relating to peers and adults, social norms, taboos, rules and regulations. Further, in the process of relating to others, students build up their sense of identity and ascertain for themselves the form of community life that is most fulfilling.

The centrality of the human aspects of schooling distinguishes schools from other workplaces. As such, the quality of school life is important in and of itself. In addition

to its intrinsic value, students' quality of school life has been found to be associated with the academic and other outcomes of schooling. Research evidence (Ainley & Bourke, 1992) has suggested that students' quality of school life is directly related to their academic achievement. For instance, it was found that, for a sample of 5932 Grade 12 students, the quality of school life accounted for 20% of the variance of students' achievement at public examination (Cadima, Doumen, Verschueren, & Buyse, 2015).

Further, students' attitude to school was associated with their intentions to stay at the school (Lyndon et al., 2017). Students who had better school lives also had stronger intentions to stay in school after the compulsory years, even after controlling for achievement levels. In addition, students who felt more favorably toward school were more likely to accept responsibilities for their own performance (Wang & Holcombe, 2010).

Slee concluded, after a review of Australian studies, that the basic strategy to the prevention of misbehavior in schools was a positive school environment. According to the above studies, students spend a lot of their time at school and will therefore be responsible in the future in various fields. Therefore, the quality of life in learners implicitly embracing psychological foundations, such as epistemological beliefs as well as quality of life in educational settings can be attributed to their role in mental health and academic achievement. Therefore, it is important to identify and to consider the factors affecting it.

On the other hand, the study of previous researches in this field reveals the existence of appropriate research in order to present a scientific model of academic achievement in this field and necessitates the necessity of research in this field.

Considering the above, the main goal of this research is to model the structural relationships between epistemological beliefs, the quality of life of the school with the student's academic achievement. Therefore, for this purpose, the following model was mapped based on the theoretical basis and the results of previous studies referred to as a hypothetical model. Modeling involves applying all relevant theories, research, and information available in the theoretical model.

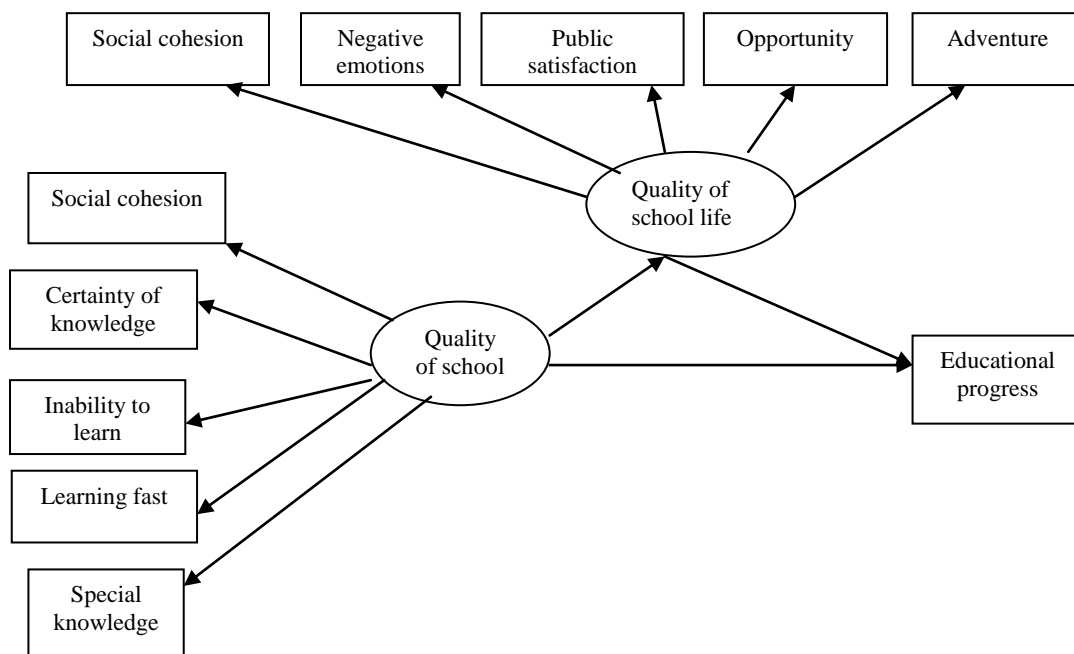


Figure 1. The hypothetical conceptual model of the research according to Schomer's (1990) and Einlegh Webber (1992)

## 2. Method

This research, based on its purpose of research, is fundamental in terms of data collection method, its cross-sectional method and its analysis, using a descriptive method and a type of correlation research based on Structural Equation Modeling (SEM) method specifically Regression equations (combination of path analysis and factor analysis of the second level). The statistical population consisted of all boys of the first year of secondary school in Babol. In this study, the sample size was chosen to determine the sample size according to the number of observed variables and the allocation of the coefficient 25 for each observed variable ( $25 \times 11$ ) and considering the probability of having 310 questionnaires as the sample size. To conform to the structural equation model, the sample number should be at least 15 times the observed variables (Stevens 1994, quoted by Hooman, 2014). After determining the sample size, the samples were selected by multistage cluster random sampling method. In the first stage, a region was selected randomly from the two districts of Babol, and in the

second stage, of the first two secondary schools, 5 schools were randomly selected. Then 11 clusters (classes) were selected randomly.

### 3. Findings

Initially, by examining the statistical assumptions, using tests, elongation, skewness and box, Kolmogorov-Smirnov was detected and then deleted data were detected. By using the Mahalanubis test, the data of Perth were also verified after verifying the normalization of the data in the model for measuring two variables of research.

Also, the results of the average extraction variances (AVE) show that all subscales of epistemological beliefs and school life quality in the model of measuring its values is greater than the threshold of 0.5, which indicates the validity of the type Convergent. Also, composite stability (structural stability) indicates that the values obtained from the components exceed the threshold of 0.77 and therefore the subject matter of the AVE and CR questionnaires is confirmed.

**Table 1. Pearson correlation matrix of epistemological beliefs and quality of life in school with academic achievement**

Variable	M	SD	1 <sup>a</sup>	2 <sup>a</sup>	3 <sup>a</sup>	4 <sup>a</sup>	5 <sup>a</sup>	6 <sup>a</sup>	7 <sup>a</sup>	8 <sup>a</sup>	9 <sup>a</sup>	10 <sup>a</sup>
Simplicity of scholarship	32.76	7.13	1									
Certainty of knowledge	31.28	7.61	.66	1								
Inability to learn	40.8	7.84	0.44	0.40	1							
Learning fast	40.62	8.5	0.35	0.37	0.70	1						
Special knowledge	38.16	5.9	0.16	0.19	0.46 <sup>b</sup>	0.58	1					
Social cohesion	20.35	3.44	-0.26	-0.30	-0.60	-0.42	-0.47	1				
Negative emotions	20.55	4.85	-0.43	-0.36	-0.64	-0.62	-0.36	0.43	1			
Public satisfaction	21.13	4.45	-0.13	-0.35	-0.63	-0.50	-0.40	0.41	0.6	1		
Opportunity	19.97	4.72	-0.21	-0.23	-0.55	-0.50	-0.63	0.37	0.58	0.53	1	
Adventure and adventure	19.27	3.85	-0.20	-0.25	-0.45	-0.50	-0.59	0.45	0.38	0.39	0.53	1
Educational Progress	15.18	2.51	-0.29	-0.20	-0.29	-0.37	-0.46	0.27	0.27	0.33	0.30	0.44

a: At the level of 0.01 is meaningful,

b: is significant at level 0.05, N=289

The results in Table 2 show a significant negative correlation between the subscales of epistemological beliefs and the academic achievement of students, and there is a positive correlation between the quality of life of the school with the academic achievement of the students in the levels of 0.01.

**Table 2. indicators derived from the analysis of data and variables after three correction steps**

Title of exam	Description	Acceptable values	The amount is obtained
$\chi^2/df$	Cayenne Relative	3>	2.566
RMSEA	Average root of mean square second approximation of error	0.1>	0.051
GFI	Adjusted fitness index	>0.9	0.958
NFI	Soft index	>0.9	0.922
CFI	Comparison index	>0.9	0.933
DF	57		

The RMSEA value is 0.051, so this value is less than 0.1. As a result, the average of the squared errors of the model is acceptable. Also, the chi-square of two degrees of freedom (2 566/2) is between 1 and 3, and the GFI, CFI and NFI index is approximately equal to 0.9.

**Table 3. Direct estimation of the model with maximum exponential**

Variable	b	$\beta$	R <sup>2</sup>
Epistemological beliefs on academic achievement	-0.31	-0.51	-0.15
The quality of school life on academic achievement	0.38	0.27	0.10

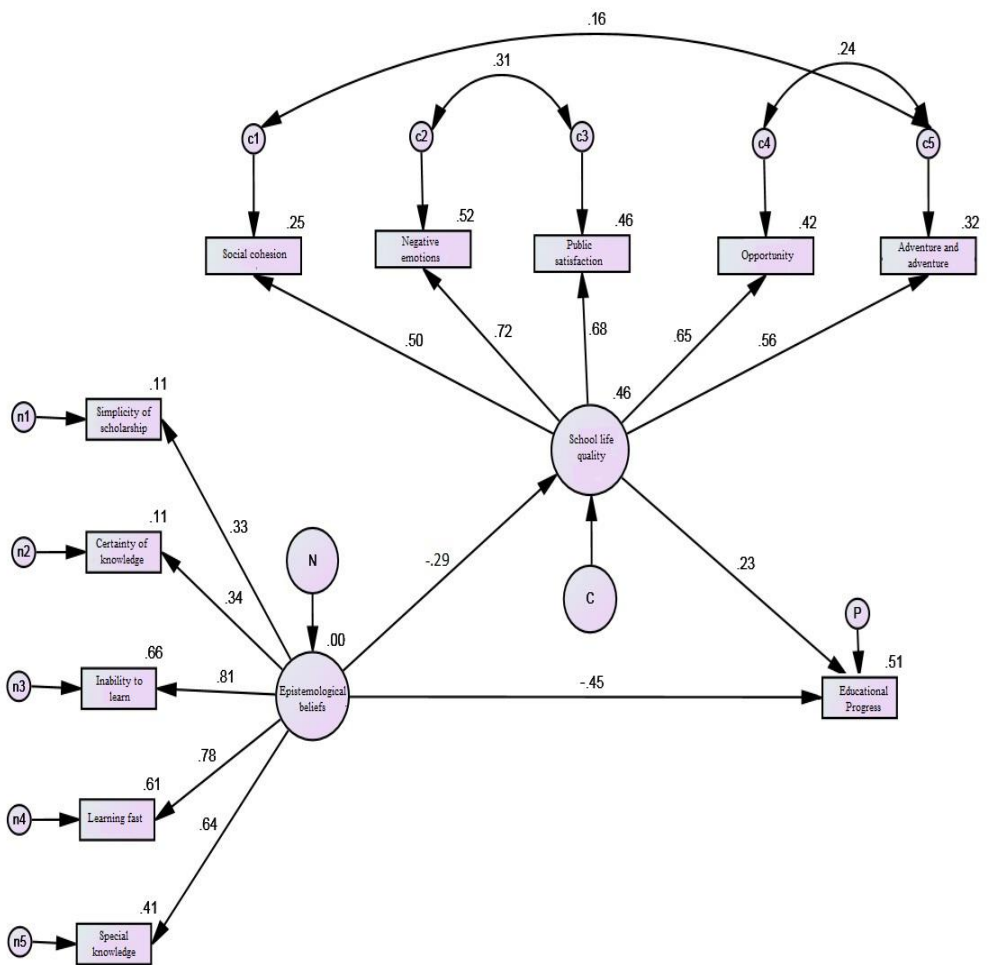
According to the above table, the epistemological beliefs and quality of life of the school have a direct effect on academic achievement.

**Table 4. Direct estimation of the model with maximum exponential method**

Variable	Direct route	Indirect route	R <sup>2</sup>
Epistemological beliefs with mediating the quality of School life on academic achievement	-0.45	-0.29	0.13

According to the data in Table 4, the explained variances (R<sup>2</sup>) are equal to 0.13, and as a result, have an indirect effect on academic achievement with respect to the mediating quality of school life.

Figure 2. Finalized model tested with standardized statistics



#### 4. Results and Discussion

The purpose of the present study was to model the structural relationships between epistemological beliefs, school life quality and academic achievement. This study suggests that epistemological beliefs by mediating school quality of life have an indirect effect on academic achievement. According to the final model of research, exogenous variables have a predictive power of 51% of variables of academic achievement and generally approved by the research model. The amount of the effect of epistemological beliefs on academic achievement in this direction is -0.51 which is



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very significant and affects the academic achievement. On the other hand, this factor can be very much influenced by the components that epistemological beliefs include. These beliefs have different dimensions and include categories such as knowledge source, knowledge certainty, knowledge organization, knowledge acquisition speed, and control of learning process (Schumer et al., 1993). In general, the components are intertwined with the core of the education and the basis for the purpose of acquiring knowledge. These results are consistent with the past findings in assessing the relationship and predictability of academic achievement based on epistemological beliefs of students. Some studies (Schommer, Crouse, and Rhodes, 1992; Chan & Stachez, 2001) have shown that epistemological beliefs can be a critical determinant of academic achievement. In the research of Lin, Dang, Tea and Tassi (2012), the relationship between epistemological and motivational beliefs of high school students was studied. The results showed that students who have stronger beliefs about changeable knowledge (lack of knowledge) experience more test anxiety. Therefore, it can be inferred from this view that the structure of academic achievement and knowledge acquired outside the minds of students does not exist, but is the result of continuous interaction with existing structures and testing and refining its subjective representations in order to find a more correct understanding of the outside world. On this basis, learning activities should be taken into consideration rather than educational process. Constructivism is seeking a functional adaptation or a fit between new knowledge and past experiences, rather than seeking to adapt or match the mind and the world. Their emphasis is on the ability of the human mind to build and tolerate categories in the world. Another result of this study is the direct relationship between school quality of life and academic achievement. The prediction of the predictive role of school quality of life in predicting the academic achievement of students also indicates the predictive effect of school quality of life and its components; it explains 0.27% of variance in academic achievement. Researchers have examined the relationship between individual characteristics and quality of life such as good life, the development of values, self-esteem, stress control, concern and uniformity in the field of school and education. Accordingly, it can be seen that quality of life is often measured by using objective indicators or mental indicators and rarely measured using both types of indicators, but quality indicators can be from two spatial and social perspectives to be analyzed. These two spatial and social views will continuously determine the behavioral feedback of the individual in the environment, so that the quality of life can determine the infrastructure of the positive and negative performance of the individual and the quality of social life of the way other people

communicate with this Person's behaviors. In the school environment, these conditions may sound like that the educational and classroom infrastructure of the school on the one hand, and on the other hand, the relationship with the peer group and the interaction with the teachers and school authorities on the other hand determines many psychological components which include self-efficacy, optimism to performance, and other factors that increase the level of performance of an individual in the school environment. The path of epistemic beliefs with mediating the quality of life of the school on academic achievement, according to the obtained value, has an explained variance of 0.13 and has a direct effect on academic achievement with respect to the mediating quality of school life. Together with these results, Aliyev, Arowin (2015) and Bartholomew and Stahl (2005) showed that beliefs in students about the quality of life at school can affect the enthusiasm and attachment to academic curriculum. Also, Barzegar Bafroavi and Sa'di Pour (2012) showed that epistemological beliefs, in addition to direct impact, can have indirect effects on students' academic performance due to academic self-efficacy and meta-cognitive self-regulation. Therefore, given that the quality of school life can affect academic achievement and learner performance; these variables can play a role in mediating between epistemological beliefs and academic achievement.

On the basis of this, learners who believe that knowledge is integrated, coherent, developed, relevant, gradual, changeable, and temporal, seem to have a higher degree of self-efficacy and higher academic achievement, and vice versa, those who have low-level beliefs (Such as inherent ability to perceive, easy to understand the learning process, the quick knowledge of the learning process and the absolute knowledge of knowledge), their lower self-efficacy. According to these findings, Schumer (1992) also argues that the learner believing that a high-level epistemological belief system has less invariable knowledge and more variability that these beliefs can have on direct or indirect effects on learning. In particular, these findings indicate that students who believe in the relative and complexity of knowledge, the acquisition of learning ability and the gradual nature of the learning process, are more likely to feel worthwhile and more efficient in learning and are likely to come from high-level cognitive strategies such as self-discipline metacognition followed by better learning outcomes.

## **5. Conclusion**

The result is that learners with epistemological beliefs, during a sequence with a combination of quality of school life, improve academic achievement. Generally

speaking, due to the significant amount of prediction of academic achievement by epistemological beliefs and school quality of life and educational systems are intended to strengthen students' academic achievement. In the first step, we must always evaluate the attitudes of individuals and their behaviors in a number of ways. In the second step, by examining educational facilities, they can strengthen this quality of communication between an educational and comprehensive environment.

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