



Research Paper

Design and Validation of a Model for Improving Academic Performance of Middle School Students in Ardabil City



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Abstract

This study aimed to design and validate a model for improving the academic performance of first-grade secondary school students in Ardabil City. The research was applied in terms of its objective and mixed in terms of its nature. The qualitative population consisted of experts, professors, and academic specialists in the field of educational sciences and all its branches in Ardabil. The quantitative population included all secondary school teachers in Ardabil's first-grade secondary schools. In the qualitative section, the sample size was determined based on the principle of saturation, totaling 20 individuals. For the quantitative section, proportional stratified random sampling was used to select a sample size appropriate to the population size of approximately 270 individuals. Data collection tools included interviews and a researcher-made questionnaire. According to the results, the reliability of all categories was greater than 0.7, indicating that the questionnaire's reliability was ideal and satisfactory. The composite reliability of all categories was also higher than 0.7 and greater than the average variance extracted (AVE), indicating convergent validity. Discriminant validity was also confirmed by the HTMT criterion. The research findings indicated that the improvement of the academic performance of students in Ardabil was categorized and validated under seven components: student commitment and willpower, effective communication with teachers, individual factors, planning and organizing, use of effective teaching techniques, family support, and an appropriate educational environment and facilities ($\text{sig} < 0.05$). Ultimately, it is suggested that the Ministry of Education should develop educational programs, employ differentiated teaching, provide facilities and equipment, create positive learning environments, present parents and officials as supporters, and use extracurricular activities to improve students' academic performance.

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Introduction

The study of factors affecting academic performance has gained increasing attention from education specialists over the past three decades. The sensitivity of education on the one hand and the complexity of the contemporary world on the other, demand more knowledgeable managers and teachers to create a conducive environment for collective growth. Today, the focus of education has shifted from merely providing educational programs or managing classroom behavior to cultivating motivated and strategic students (Paris & Winograd, 2012). Academic performance is significant because school achievement impacts learning, and in turn, school learning influences academic success. To enhance students' motivation towards learning various subjects, teachers must strive to improve learning conditions and increase the quality of teaching methods. Through this, students can achieve success and gain confidence in their learning abilities (Saif, 2009). The need for achievement is one of the needs introduced by Murray. Achievement motivation is an individual's desire to reach personal goals. This goal could be obtaining an 'A' in a psychology course or climbing a mountain peak (Zimbardo, 2010). Generally, individuals with achievement motivation feel a sense of control over their lives and enjoy it; they strive to improve their performance and prefer to engage in challenging tasks and allow for the evaluation of their progress. The term "academic performance" refers to the extent of an individual's school learning, as measured by various subject tests such as arithmetic,

spelling, history, geography, and the like. Several definitions of academic performance have been offered, including the extent to which a student achieves educational goals, usually in the cognitive domain and within a specific subject area (Zarin-Chang, 2005); the amount of student learning measured over a semester or an academic year through an examination at the end of the instructional period (Shokoohi, 2011); and the extent of an individual's school learning as measured by various subject tests such as mathematics, science, etc. (Shokoohi, 2011). The most common criterion for determining academic performance is the average of grades across various subjects, as it is more stable and reliable than other criteria and more accurately reflects academic achievement (Foroutan, 2008). Mao (1997: 275) defines academic performance as a set of educational behaviors displayed in two dimensions: academic progress and academic decline in acquiring knowledge. Academic performance is the standard for measuring students' learning and plays a significant role in assessing their ability to complete their education and graduate. In any society, academic performance indicates the success of its educational system in achieving its goals and addressing individual needs. Therefore, an educational system can be considered efficient if the academic performance of its learners at various levels is at its highest. Academic performance refers to the learned or acquired abilities of an individual in school subjects, measured by standardized or teacher-made tests. Undoubtedly, in today's advanced world, one of the signs of an individual's success is

academic performance, without which the development and progress of any country would be impossible. A country's advancement is directly related to its progress in science, knowledge, and technology. A significant portion of this progress results from proper and scientific planning; however, despite all these advancements, academic decline and its associated losses have caused concern among students and their families, leading to additional challenges. Ignoring this issue and failing to address it can have severe consequences, first for the students and then for their parents. Furthermore, neglecting academic performance as one of the students' educational challenges can impact their present and future lives, as one of the goals of entering the school environment is to achieve higher levels of education and consequently create a promising and bright future. On the other hand, schools should not be limited to teaching knowledge and academic subjects. To be more responsive, they must equip students with the necessary skills to adapt to changes, thus fostering the motivation and ability for lifelong learning. In other words, academic achievement refers to learners' success in academic matters, which can be measured through tests. It also involves performing tasks to achieve a desired outcome, excellence, and mastery of a skill or a set of knowledge (Shoarinejad, 2010). Therefore, this study aims to design and validate a model for improving the academic performance of middle school students in Ardabil.

Research Methodology

Given that this study aimed to design and validate a model for improving the academic performance of first-year high school students in Ardabil City, the findings can be directly applied. Therefore, this research is applied in nature and follows a mixed-method approach, encompassing both qualitative and quantitative components. Mixed-method research can be categorized into three types: concurrent, descriptive (explanatory), and exploratory. This study adopted an exploratory approach. The qualitative population consisted of all experts, professors, and academic scholars in the field of educational sciences and its various subfields in Ardabil. The quantitative population included all first-year high school teachers in Ardabil. The qualitative sample was selected through non-probability purposive theoretical sampling, with a sample size determined by the principle of theoretical saturation, resulting in 20 experts, professors, and academic scholars in the field of educational sciences being chosen for the qualitative part of the study. To determine the sample size for the quantitative part, given the population size of 900 teachers, Cochran's formula was used, and 270 teachers were selected through stratified random sampling.

To identify factors that improve the academic performance of first-year high school students in Ardabil, initial questions were designed, and interviews were conducted. The interviews in this research were semi-structured. To control the quality of the codes extracted from these semi-structured interviews, a comparison between the researcher's findings and an expert's

opinion was utilized. This means that the selected expert, without knowledge of the initial coding, independently coded the content, and the agreement between the researcher and the expert indicates the reliability of the research. The Kappa coefficient was used to calculate the inter-rater agreement. The Kappa index is employed only for variables that have the same level of measurement and the same number of categories. This coefficient ranges

from -1 to +1, with values closer to +1 indicating higher agreement and values closer to -1 indicating lower agreement. A Kappa value of zero indicates no agreement at all. After collecting qualitative data, the interview texts were coded using thematic analysis. Finally, based on the core themes, a Likert-scale questionnaire (5-point scale; 1 to 5) was developed and distributed to the quantitative sample for data collection.

Table 1: Cronbach's Alpha, Composite Reliability, Average Variance Extracted, and Coefficient of Determination

Categories	Cronbach's Alpha	Composite Reliability (C.R)	Average Variance Extracted (AVE)	Coefficient of Determination (R ²)
Student Commitment and Willpower	0.867	0.894	0.508	0.432
Effective Communication with Teachers	0.787	0.854	0.539	0.485
Individual Factors	0.845	0.880	0.517	0.640
Planning and Organization	0.768	0.843	0.518	0.409
Use of Effective Teaching Techniques	0.888	0.907	0.502	0.621
Family Support	0.886	0.906	0.508	0.580
Educational Environment and Facilities	0.804	0.859	0.504	0.312

Based on the results from the table above, the reliability of all categories exceeds 0.7, indicating that the reliability of the

questionnaire is at an ideal and satisfactory level. The composite reliability of all categories is also above 0.7 and greater than the Average Variance Extracted (AVE),

which demonstrates convergent validity. Furthermore, the AVE for all categories is greater than 0.5, providing additional confirmation of the convergent validity of the

questionnaire. To assess discriminant validity, the Heterotrait-Monotrait ratio (HTMT) was used. The results of the HTMT criterion are presented in the following table:

Table 2: HTMT Index Results for Assessing Discriminant Validity of the Academic Performance Improvement Model for Students in Ardabil

Dimensions	Student Commitment and Willpower	Effective Communication with Teachers	Individual Factors	Planning and Organization	Use of Effective Teaching Techniques	Family Support	Educational Environment and Facilities
Student Commitment and Willpower							
Effective Communication with Teachers	0.220						
Individual Factors	0.515	0.577					
Planning and Organization	0.712	0.537	0.290				
Use of Effective Teaching Techniques	0.470	0.514	0.788	0.298			
Family Support	0.203	0.817	0.731	0.553	0.510		
Educational Environment and Facilities	0.726	0.395	0.188	0.730	0.414	0.178	

The HTMT criterion has replaced the older Fornell-Larcker method for assessing discriminant validity. If the HTMT values are below 0.90, the discriminant validity is considered acceptable. Based on the data in the table above, all values are below 0.90, confirming the model's discriminant validity. In the process of confirmatory factor analysis, it is essential first to assess the construct validity to ensure that the selected indicators accurately measure the intended constructs. Given the results of composite reliability, average variance extracted (AVE), and the HTMT criterion, the construct validity of the model (including both convergent and discriminant validity) has been confirmed.

Research Findings

What is the Model for Improving the Academic Performance of Students in Ardabil?

Information regarding the factors influencing the improvement of academic performance among students in Ardabil was gathered through interviews. These interviews were then coded using thematic analysis with the help of MaxQDA software. Following each question, a sample from the

interviews is provided, where the letter "M" indicates a male interviewee, and the letter "F" indicates a female interviewee. The semi-structured interview questions were as follows:

- 1.What responsibilities does the student have to improve their academic performance?
- 2.What responsibilities do teachers have to improve a student's academic performance?
- 3.What responsibilities does the family have to improve a student's academic performance?
- 4.What role do the educational environment and infrastructure play in improving a student's academic performance?

The results of these interviews, along with the corresponding codes, are presented below for each question:

1-What responsibilities does the student have to improve their academic performance?

In response to this question, the results of the qualitative content analysis regarding the student's responsibilities for improving academic performance identified 3 main categories and 23 subcategories as follows:

Table 3: Coding for Academic Performance Improvement Based on Student Responsibilities

ROWS	Subcategories	Main Categories
A1	Commitment to regular class attendance	Student Commitment and Willpower
A2	Responsibility	
A3	Commitment to following school rules and regulations	
A4	Willingness to learn	
A5	Commitment to completing assignments	

A6	Commitment to establishing healthy relationships with classmates	Effective Communication with Teachers
A7	Willingness to develop personal abilities	
A8	Effort to achieve academic goals	
A9	Active participation in school activities	
A10	Maintaining positive relationships	
A11	Proper use of guidance	
A12	Attention to personal academic needs	
A13	Understanding teacher feedback	Individual Factors
A14	Friendly communication and interaction	
A15	Intelligence	
A16	Self-confidence	
A17	Academic aptitude	
A18	Acceptance of errors	
A19	Self-efficacy	
A20	Motivation	
A21	Independence	
A22	Successful experience	

The main categories derived from the qualitative data analysis include Commitment and Willpower, Effective Communication with Teachers, and Individual Factors. Below is an explanation of each of these categories:

Commitment and Willpower

The first main category related to the student's role in improving academic performance is **Commitment and Willpower**. Commitment and willpower towards improving academic performance involve sufficient efforts to enhance, develop, and advance one’s knowledge and skills across various educational domains. It includes embarking on this path, understanding the associated difficulties, and planning to overcome these challenges. The qualitative content analysis suggests that the improvement of students' academic performance initially depends on their willpower. As long as the student is not committed to improving their academic

performance and does not have the will to meet their needs, no improvement will be achieved.

Interviewee M.3:

"First and foremost, the student must be committed to regular class attendance and responsibility. As long as a student does not attend classes regularly, growth and improvement will not be possible. The student must first attend the class and respect its rules. Respecting classroom and school rules can ultimately lead to discipline in the student, which in turn can lead to their progress.

Interviewee M.4:

"For successful classroom attendance, which is essential for improving academic performance, students should be able to establish healthy relationships with their classmates. Such relationships can ultimately maximize the benefit of the classroom.

Healthy relationships can foster students' personal growth and also support their academic development with the help of teachers. Therefore, teachers should strive to create a warm and friendly environment among students."

Interviewee M.2:

"Learning is a complex issue with many factors involved. Concerning the student's role, if we can place part of the responsibility for learning and academic progress on the students themselves, we can expect to see positive outcomes in improving academic performance.

Effective Communication with Teachers

Having effective communication with teachers can be beneficial and inspiring for students, aiding their advancement and improvement across various academic and emotional dimensions. Students who can establish good relationships with their teachers and make full use of their knowledge and experience can have greater hope for improving their academic performance. Proper utilization of the guidance and advice provided by teachers can become a turning point in their academic lives, provided it is given at the right time and in an acceptable manner.

Interviewee F.2:

"Sometimes in school and the classroom, a student faces a problem, whether academic or behavioral. In such cases, the timely presence of the teacher and the provision of guidance to solve the problem can strengthen the relationship between the student and the

teacher. Over the years, I have repeatedly seen that such relationships can lead to students' progress in various aspects. When a student feels that their teachers are involved in their problems, a strong relationship is formed that can be utilized later."

Interviewee M.9:

"We have always heard that school is a second home for students. Let's think for a moment. How do family members behave with each other in their own homes? Such relationships should also exist between teachers and students in the school environment. A friendly and intimate relationship, accompanied by positive interactions, is essential. I promise you that reaching such a level of relationship will lead to significant success and noticeable progress in various areas."

Interviewee M.12:

"Completing assignments is an integral part of schooling. We all know that to improve students' academic performance, their assignments should be reviewed and appropriate feedback should be provided. Feedback from teachers on these assignments can serve as a roadmap for students to identify and address their problems. A student who accurately identifies their academic needs after receiving feedback from teachers can move towards improving their academic performance. However, it is crucial to note that such improvements might be less likely without a positive relationship between the student and the teacher.

Individual Factors

The category of individual factors has been identified as another significant factor influencing the improvement of students' academic performance. This category indicates that there are elements specific to the students themselves that originate from within them. Factors such as motivation, academic talent, intelligence, and so on are considered individual factors affecting academic performance. Each of these factors can emerge at the right time and place, contributing to the student's growth.

Interviewee M.9:

"Some students have a special talent in certain academic subjects and can achieve remarkable success. However, the same students might not achieve such success in other subjects. This is where the role of talent comes into play. A skilled teacher should discover this talent and work on nurturing it. Talent can lead to progress even in the absence of other growth factors. Overall, it is a crucial factor in improving academic performance, provided it is directed correctly.

Interviewee M.15:

"Alongside the previously mentioned factors, intelligence also holds high value. Having a high level of various types of intelligence is a significant advantage. The ability to solve problems, which is a result of high intelligence, can greatly aid in students' progress in different dimensions and subjects.

Interviewee M.7:

"Are you familiar with the term self-efficacy? Do you know what it refers to? Self-efficacy refers to an individual's belief in their ability to accomplish a task or achieve a goal. Imagine a student who has developed a strong sense of self-efficacy, enabling them to solve problems and progress in their academic subjects with high confidence. Such students can continually grow and improve their abilities even in the absence of some other factors. Whether these abilities are academic or behavioral, they are considered highly important.

Interviewee M.5:

"As long as a person does not want to succeed, they cannot be pushed towards success. A student must personally possess the motivation and necessary abilities for advancement. Therefore, to improve academic performance, it is essential to cultivate motivation in the student as much as possible, so they will naturally move towards progress.

2- To improve a student's academic performance, what responsibilities do teachers have?

Based on the qualitative content analysis of teachers' responsibilities in improving academic performance, 2 main categories and 16 sub-categories have been identified as follows:

Table 4 - Coding of Academic Performance Improvement Based on Teachers' Responsibilities

ROWS	Sub-Categories	Main Categories
A23	Setting Educational Goals	Planning and Organization
A24	Time Management	
A25	Organizing Space	
A26	Effective Use of Resources	
A27	Curriculum Planning	
A28	Interactive Learning	
A29	Use of Educational Technology	Effective Teaching Techniques
A30	Assessment and Providing Feedback	
A31	Stress Management	
A32	Encouraging Collaboration and Teamwork	
A33	Variety in Teaching Methods	
A34	Providing Appropriate Exercises	
A35	Practical Methods	
A36	Group Activities	
A37	Creating a Positive Learning Environment	
A38	Encouraging Creativity	

Main Categories Derived from Qualitative Data Analysis: Planning and Organization, and Effective Learning Techniques

Planning and Organization

The analysis of qualitative data revealed that, for teachers to significantly impact students' academic performance, they must pay special attention to planning and organizing various factors. Setting educational and developmental goals, managing time, and organizing the learning environment are essential aspects that can aid teachers in this complex process. Teachers who are committed to improving their students' performance consistently strive to ensure that all teaching and learning activities follow pre-established plans. These plans may include factors such as timing, location, and feedback.

Interviewee M.9:

"Any teacher who loves their job knows that to advance their students, they must always have a plan. The first step in curriculum planning is setting educational goals. These goals should be designed to address various educational and developmental aspects of students. Properly setting these educational goals reflects the teacher's dedication to their profession and their concern for their students."

Interviewee M.6:

"We know that improving students' academic performance depends on various factors. However, for us teachers, after setting educational goals, one of the most important aspects is time management and the correct use of educational resources. Time management is straightforward: completing tasks on time is a necessity for progress. Regarding the latter, I've observed colleagues over the years who do not use available educational resources effectively. Misuse of

these resources at inappropriate times and places will certainly lead to negative effects.

Interviewee F.1:

"Every teacher has their unique working style, often referred to as their personal preference. We have previously discussed setting educational goals, which is part of curriculum planning. Let me elaborate. For a teacher to succeed, they must have a curriculum plan. I don't mean at a macro level but rather at a micro level, including setting educational goals, methods of providing feedback and assessment, anticipating educational resources, and so on. I believe that if a teacher has such a plan, they can be hopeful about the results of their work."

Effective Teaching Techniques

Maintaining dynamism in the classroom and educational and developmental programs, ensuring that students do not experience fatigue or frustration, can significantly impact students' academic performance in the short term. However, achieving this requires attention to several crucial factors. According to qualitative data analysis, teaching techniques employed by teachers can ensure success for both teachers and students if they follow certain principles and rules. Techniques such as interactive methods, group activities, and providing appropriate feedback are among the most significant factors that contribute to effective teaching.

Interviewee M.4:

"After years of teaching at various levels, experience has taught me that for my success, I must have a positive interaction with my

students. This positive interaction should be present in all aspects of my work. Using interactive teaching methods can be the best option for teachers who are genuinely aiming to improve their students' academic performance. If a student feels that they have even a small role in the teaching process and classroom management, they will undoubtedly do everything possible to advance."

Interviewee M.3:

"People are inherently diverse in their preferences, and students are no exception. Just imagine, if you diversify your teaching methods or even encourage your students to engage in creative activities and provide them with appropriate feedback, what excitement it will generate in them. We must recognize that students are eager for group activities where they can showcase their creativity. The reality is, that for a teacher who wants to witness their students' growth, there are many paths to take. It's up to the teacher to choose whether they want a dynamic or stagnant classroom."

Interviewee M.5:

"A teacher, due to the conditions in the classroom, must be able to use various teaching methods at different times. The art of teaching lies in effectively utilizing the students' capacities. Encourage students to collaborate and let them learn together. This approach will not only be fruitful but also reduce your workload."

3-What Responsibilities Do Families Have to Improve a Student's Academic Performance?

In response to this question, the results of the qualitative content analysis regarding the responsibilities of families in improving

academic performance reveal one main category and eleven subcategories as follows:

Table 5 - Coding of Academic Performance Improvement Based on Family Responsibilities

ROWS	Subcategories	Main Category
A39	Meaningful family environment	Family Support
A40	Providing a suitable study space	
A41	Encouraging responsibility	
A42	Encouraging academic pursuits	
A43	Supporting the completion of academic tasks	
A44	Providing learning opportunities outside school	
A45	Caring for students' physical and mental health	
A46	Collaborating with the school	
A47	Involving in decision-making	
A48	Facilitating access to educational resources	
A49	Providing useful recreational activities	

The main categories obtained from the qualitative data analysis include: family support, which is given below the description of this category.

Family Support

Although today the educational and pedagogical roles of the family have largely been transferred to educational institutions due to industrialization, urbanization, and the expanding needs of society, the responsibility of the family cannot be completely dismissed. Neglect by the family in fulfilling its roles and deficiencies in other areas also affect the educational and pedagogical functions of the educational institutions. One of the continuous and essential functions of the family in education is providing academic support and raising awareness among

children. This helps individuals become aware of school rules, educational regulations, and examination procedures, solve their academic problems, and ultimately improve their academic performance.

Interviewee M.7:

I believe we all agree on the importance of the family. Nowadays, teachers, due to large class sizes and the volume of coursework, cannot address the needs of all students effectively. While teachers put in effort and time, they are unable to meet the diverse needs of students as they would like. Therefore, a reliable partner is needed. Families, with all their capacities, can be the best support for teachers. However, it is crucial to ensure there is positive coordination and collaboration between the school and the

family. Another important role of the family is to care for students' physical and mental health. This is extremely important and has a significant impact on students' academic performance.

Interviewee M.1:

For families to succeed in their children’s education, they need to address their basic educational needs. Providing primary educational resources and creating a suitable study environment is crucial. However, I believe that emotional and psychological support is even more important. Such support can enhance students' self-confidence and guide them toward progress. Although it is challenging to understand and involve a student going through adolescence in decision-making, if achieved, I have high hopes for the positive results.

Interviewee M.4:

The family's role in improving students' academic performance has two dimensions. The first is cooperation with the school, including aligning with school programs and meeting students' educational needs. The second dimension is within the family itself. Involving students in decision-making can increase their sense of human value and self-confidence. Responsibilities assigned by the family can make students feel valued, which is one of the main factors contributing to their progress.

4 - What role do the educational environment and infrastructure play in improving a student's academic performance?

In response to this question, the qualitative content analysis regarding the role of infrastructure and environment in improving academic performance revealed 1 main category and 6 sub-categories as follows:

Table 6 - Coding Academic Performance Improvement Based on Infrastructure and Environment

ROWS	Sub-Categories	Main Category
A50	Provision of Adequate Educational Space	Educational Environment and Facilities
A51	Respect for Students' Specific Needs	
A52	Academic Support	
A53	Useful Extracurricular Activities	
A54	Adequate Equipment and Resources	
A55	Interactive Learning Opportunities	

The main category derived from the qualitative data analysis is: Appropriate Environment and Facilities, which is detailed below.

Appropriate Environment and Facilities

According to research, a suitable educational environment can positively impact students' academic performance.

Environmental factors such as lighting, thermal comfort, spatial proportions, green space, accessibility, noise levels, and colors are crucial elements that can influence students' academic outcomes both positively and negatively. Additionally, the qualitative data analysis indicates that the role of educational equipment and extracurricular activities is unparalleled in improving students' academic performance. Proper use of these resources, combined with previously mentioned factors, can play a significant role in enhancing students' academic achievements.

Interviewee M.2:

In the years I have been teaching, one of my fundamental issues has been the lack of appropriate educational equipment. When you want to teach a topic in class and the necessary equipment is not available, you are forced to use traditional methods like

lecturing. Honestly, those times are past. You cannot satisfy students who have grown up with modern technology using traditional lecture methods. This is why I place a high emphasis on having suitable educational equipment.

Interviewee M.5:

Sometimes, the activities conducted within the classroom are not sufficient for understanding the material. This is when extracurricular activities can properly educate students. For instance, science lessons are those that genuinely require personal experience. Students need to experience some of the topics themselves to fully grasp the material. For example, scientific field trips can sometimes be beneficial. Alternatively, interactive learning situations where students learn from each other can have better effects than teacher-led instruction.

Table 7 - Results of Coding Interview Texts Using Thematic Analysis to Identify Factors Affecting Academic Performance Improvement of Students in Ardabil County

ROWS	Basic Themes	Organizing Themes	Overarching Theme
A1	Commitment to Regular Class Attendance	Student Commitment and Will	
A2	Responsibility		
A3	Commitment to School Rules and Regulations		
A4	Willingness to Learn		
A5	Commitment to Completing Assignments		
A6	Commitment to Maintaining Healthy Relationships with Peers		
A7	Willingness to Develop Personal Abilities		
A8	Effort to Achieve Academic Goals		
A9	Active Participation in School Activities		
A10	Maintaining Positive Relationships		

A11	Proper Use of Guidelines	Effective Communication with Teachers	Improving academic performance
A12	Attention to Academic Needs		
A13	Understanding Teacher Feedback		
A14	Friendly and Interactive Communication		
A15	Intelligence	Individual factors	
A16	Self-confidence		
A17	Academic Talent		
A18	Acceptance of Mistakes		
A19	Self-efficacy		
A20	Motivation		
A21	Independence		
A22	Successful Experience		
A23	Setting Educational Goals	Planning And Organization	
A24	Time Management		
A25	Organization of Space		
A26	Proper Use of Resources		
A27	Curriculum Planning		
A28	Interactive Learning	Effective Teaching Techniques	
A29	Use of Educational Technology		
A30	Evaluation and Providing Appropriate Feedback		
A31	Stress Management		
A32	Encouragement of Collaboration and Brainstorming		
A33	Variety in Teaching and Learning Methods	Family support	
A34	Providing Appropriate Exercises		
A35	Use of Practical Methods		
A36	Group Activities		
A37	Creating a Positive Learning Environment		
A38	Encouragement of Creativity		
A39	Meaningful Family Environment		
A40	Providing a Suitable Study Space		
A41	Encouragement of Responsibility		
A42	Encouragement of Study		
A43	Support in Completing Academic Tasks		
A44	Providing Learning Opportunities Outside School		
A45	Care for Students' Physical and Mental Health		
A46	Collaboration with School	Educational Environment and Facilities	
A47	Involvement in Decision-Making		
A48	Facilitating Access to Educational Resources		
A49	Providing Useful Recreation		
A50	Providing an Appropriate Educational Space		
A51	Respecting Students' Specific Needs		
A52	Academic Support		
A53	Beneficial Extracurricular Activities		
A54	Adequate Equipment and Resources		

Improving Student Academic Performance in Ardabil County: Analysis and Validation

Student academic performance in Ardabil County has been categorized under seven main components based on the analysis of interview data. These components include:

Student Commitment and Will: This encompasses regular class attendance, responsibility, adherence to school rules and regulations, willingness to learn, commitment to completing assignments, maintaining positive relationships with classmates, motivation to develop personal abilities, striving to achieve academic goals, and active participation in school activities.

Effective Communication with Teachers: This includes maintaining positive relationships, properly utilizing guidance, addressing one's educational needs, understanding teacher feedback, and fostering friendly interaction.

Personal Factors: This covers intelligence, self-confidence, academic aptitude, acceptance of errors, self-efficacy, motivation, independence, and past success.

Planning and Organization: This involves setting educational goals, time management, organizing learning spaces, proper use of resources, and lesson planning.

Effective Teaching Techniques: This includes interactive learning, use of educational technology, providing and

evaluating feedback appropriately, stress management, encouraging collaboration and brainstorming, diversity in teaching methods, providing suitable exercises, using practical methods, group activities, creating a positive learning environment, and fostering creativity.

Family Support: This consists of providing a meaningful family environment, creating suitable study space, encouraging responsibility, promoting education, supporting homework completion, offering out-of-school learning opportunities, caring for the physical and mental health of students, collaborating with the school, involving students in decision-making, facilitating access to educational resources, and providing beneficial recreational activities.

Appropriate Learning Environment and Facilities: This involves ensuring adequate educational space, respecting students' specific needs, providing academic support, engaging in beneficial extracurricular activities, having sufficient equipment and resources, and offering interactive learning opportunities.

To ensure the quality of the codes and components extracted from the interviews, the initial codes were reviewed by the supervisor. After receiving approval, they were also evaluated by another researcher to calculate the Kappa coefficient, as discussed in Chapter 3. The Kappa value, calculated

using SPSS software, was 0.723 with a significance level of 0.0001. This indicates that the coding is reliable.

Table 8: Summary of Kappa Coefficient Calculations

Measure	Value	Standard Deviation	Significance Level
Kappa Agreement Value	0.723	0.058	0.0001

For content validity of the interviews, the interview texts were sent to the supervisor, and their approval confirmed the validity of the interviews.

Finally, to validate the model of factors, the open codes were converted into

questionnaire items. After collecting the data, Cronbach’s alpha and confirmatory factor analysis were used for quantitative testing.

Is the Model for Improving Student Academic Performance in Ardabil County Validated?

Table 9: Results of the Kolmogorov-Smirnov Test for Normal or Non-Normal Distribution of Data

Dimensions	Test Statistic	Significance Level
Student Commitment and Will	0.066	0.006
Effective Communication with Teachers	0.054	0.056
Personal Factors	0.068	0.004
Planning and Organization	0.079	0.001
Use of Effective Teaching Techniques	0.075	0.001
Family Support	0.067	0.005
Learning Environment and Facilities	0.073	0.002

According to the table above, the significance levels for all dimensions (except for Effective Communication with Teachers) are less than 0.05 (sig < 0.05), indicating a non-normal distribution. Therefore, Partial

Least Squares (PLS) should be used for Confirmatory Factor Analysis. To evaluate the overall model fit, the Goodness of Fit (GOF) index was used. The GOF index simultaneously assesses the fit of both the structural and measurement models. This

index can be calculated using the geometric mean of the Average Variance Extracted (AVE) and the average R^2 values, with the formula:

$$\text{GOF} = \sqrt{\text{average (AVE)} \times \text{average (R}^2\text{)}}$$

After performing the calculations, the GOF index value obtained was 0.505. Wetzels, Odekerken-Schroder, and Van Oppen (2009) consider a GOF index value above 0.36 to be a strong indicator of model fit. Therefore, it can be concluded that the model indicators possess sufficient accuracy for measuring their constructs, and the model exhibits a good fit. Consequently, the model proceeded to the final analysis. Based on the results from the two charts, all paths are significant (all paths exceed the critical value of 0.16 in standardized coefficients), and the T-values are within the critical range of -1.96 to +1.96. Thus, all paths are significant, and the research model shows an adequate fit.

Discussion and Conclusion

This study aimed to design and validate a model for improving academic performance among middle school students in the city of Ardabil within an integrated framework. The results of the coding indicate that improving academic performance among these students is categorized under seven components: student commitment and willpower, effective communication with teachers, individual factors, planning and organization, use of effective teaching techniques, family support, and appropriate educational environment and facilities. For the component of student commitment and willpower, factor A4, titled "Learning Will," emerged as the strongest,

while factor A3, titled "Commitment to Adhering to School Rules and Regulations," was identified as the weakest.

For the component of effective communication with teachers, factor A11, titled "Proper Use of Guidance," was identified as the strongest, while factor A13, titled "Understanding Teacher Feedback," was the weakest. For the component of individual factors, factor A21, titled "Independence," was the strongest, whereas factor A20, titled "Motivation," was the weakest. For the component of planning and organization, factor A26, titled "Proper Use of Resources," was the strongest, while factor A27, titled "Curriculum Planning," was the weakest. For the component of using effective teaching techniques, factor A28, titled "Interactive Learning," was the strongest, whereas factor A32, titled "Encouragement of Collaboration and Discussion," was the weakest. For the component of family support, factor A47, titled "Involvement in Decision-Making," was the strongest, while factor A40, titled "Provision of a Suitable Study Environment," was the weakest. For the component of the educational environment and facilities, factor A51, titled "Respect for Students' Specific Needs," was the strongest, while factor A53, titled "Useful Extracurricular Activities," was the weakest.

In explaining these findings, it can be said that improving students' academic performance may be related to commitment and willpower. Commitment refers to being dedicated and adhering to one's obligations and responsibilities. Willpower also refers to an individual's motivation and determination

to carry out a specific activity. When a student is committed to their education and has the will to study, complete assignments, and conduct research effectively, their academic performance improves. Commitment to education means being dedicated to learning and progressing academically, which may include adhering to schedules and limitations, parental or school supervision, following societal norms, and prioritizing education over other activities. Additionally, willpower and motivation refer to an individual's desire and thought to act. If a student has the necessary motivation and will to advance in their studies, they are more likely to exert effort in studying, understanding topics, solving problems, and improving their academic performance. Willpower and motivation can derive from external sources, such as support from parents, teachers, and schools, or may come from internal sources as a result of interest and enthusiasm for specific educational subjects. Therefore, commitment and willpower can significantly influence the improvement of students' academic performance. Commitment to education and adherence to academic obligations, combined with interest and willingness to strive and advance in studies, can enhance students' academic performance.

Effective communication with teachers can also facilitate the improvement of students' academic performance. When a student establishes effective and healthy communication with their teachers, it enables them to have greater confidence in their education and learning, as well as to discover the best learning solutions for themselves.

Proper communication with teachers creates a safe and supportive environment for students, encouraging them to share their problems and concerns, which results in better performance in the educational environment. Furthermore, effective communication with teachers helps students develop a stronger sense of belonging and motivation towards the learning process and the school. When students feel that teachers are attentive, caring, and well aware-of their needs and abilities, their sense of independence and enthusiasm for learning increases. Moreover, effective communication with teachers provides a suitable basis for interaction and collaboration with other students. This can foster positive relationships and cooperation in the classroom, research groups, and work teams. Therefore, effective communication with teachers can create positive factors for enhancing students' academic performance. Effective communication with teachers facilitates the learning process, increases academic motivation, enhances classroom participation, and promotes positive interactions with peers.

Individual factors of a student can also have a significant impact on their academic performance. For example, students with higher levels of intelligence may have greater academic abilities and perform better in understanding and learning material, solving problems, and analyzing and interpreting information. They typically learn faster and more effectively. Therefore, students with higher levels of intelligence are likely to show better academic performance. Talent in a specific area can significantly influence the

success and academic progress of students. Students who show talent in a particular field are likely to perform better in that area. For instance, a student who has a talent for mathematics may excel in understanding and solving math problems, leading to better overall academic performance. Self-confidence plays a crucial role in improving students' academic performance. When students have confidence and believe in their ability to succeed and progress academically, they tend to exert more effort and focus more on their assignments and material. They feel that they can succeed and experience improvements in their performance. Therefore, intelligence, talent, and self-confidence can all influence students' academic performance. These factors contribute to motivation, increased effort, and focus on studies, leading to improved academic outcomes. Family support and encouragement also play an important role in this context.

Planning and organization also play a crucial role in improving students' academic performance. Planning involves setting goals and scheduling future activities, while organization refers to arranging and structuring processes and activities to achieve specific objectives. With proper planning, students can optimize their time and energy for studying and assignments. They can create regular study schedules, allocate specific times for practice and study, and integrate their daily routines with educational activities. Effective planning helps manage time and enables students to make more progress in their studies.

In addition to planning, an organization can assist students in managing their study and practice. Proper organization allows students to systematically arrange their materials and use various learning methods. They can employ specific techniques for retaining information, reviewing content, and solving problems. The organization helps students learn more efficiently and, consequently, improves their academic performance. Through effective planning and meticulous organization, students can enhance their commitment and determination toward their education, leading to improved academic outcomes.

Using effective teaching techniques also contributes to improving students' academic performance. These techniques include various strategies that help students learn better and more effectively. Generally, effective learning techniques involve active learning methods such as explaining concepts to others, using visual aids like diagrams and mind maps, selecting appropriate methods for retaining information and reviewing content, employing problem-solving techniques, engaging in interactive exercises, and utilizing diverse resources for learning. Effective learning techniques enable students to study with greater focus, understand concepts better, and retain information for longer periods. Additionally, these techniques help students regularly review material and strengthen their comprehension and reasoning skills. By employing these techniques, students gradually enhance their learning abilities and improve their problem-solving skills. Therefore, the use of effective

learning techniques, combined with proper planning and organization, can significantly improve students' academic performance. Integrating these two factors allows students to learn more effectively and efficiently, leading to better academic outcomes through appropriate planning and organization.

Family support and encouragement play a crucial role in improving students' academic performance. Family support is a significant factor in fostering motivation and interest in learning. When families show interest in their children's education and progress, students generally exhibit a greater willingness to learn and enhance their performance. Family support can include creating a conducive study environment at home, establishing regular routines for reviewing material and practicing, and providing encouragement and praise. These forms of support can enhance students' academic performance and progress.

Encouragement and recognition of students' abilities and achievements can facilitate their education. When students receive encouragement from family, teachers, and peers, their morale and self-confidence improve. Feeling valued for their efforts and abilities motivates them to improve their performance and engage more in learning. Encouragement can involve praising successful results, supporting study routines, and acknowledging progress in learning. Thus, family support and encouragement foster motivation, increase effort and improve academic performance. Combining these two factors helps students achieve their best performance in their studies.

A supportive educational environment and appropriate facilities, such as comfortable and quiet classrooms, well-equipped libraries, and up-to-date technology like computers and the Internet, encourage students to learn. These environments allow students to focus better and engage more effectively in their studies, leading to improved academic performance. Essential facilities like libraries, laboratories, sports halls, and other recreational and artistic amenities motivate students to participate in educational and extracurricular activities. When students have access to necessary resources and facilities, they tend to achieve better learning outcomes. Teachers also have specific skills that can be effectively implemented in a well-equipped environment. Additionally, a conducive environment can make teaching easier and encourage students to learn. In summary, a supportive environment and facilities can facilitate improvements in students' academic performance. Effective communication with teachers, a better learning process, high academic motivation, and positive interactions with classmates all contribute to enhancing academic performance and student progress.

Based on the research results, the following recommendations are proposed to develop and improve students' academic performance:

- Curriculum Design: Educational planners should design curricula that are effective and engaging. These programs should meet students' needs and levels and incorporate diverse methods such as interactive classes, laboratories, and group projects.

- Differentiated Instruction: Teachers should use a variety of teaching methods to address different students' needs and learning styles. This includes employing visual, auditory, and practical methods to provide a diverse understanding of the material.

- Providing Facilities and Equipment: Educational buildings should be fully equipped with modern facilities that help students achieve their best performance. Additionally, using advanced technologies such as smart TVs and tablets in the teaching process can be very beneficial.

- Creating Positive Learning Environments: Creating spaces that encourage learning and practice can enhance students' academic performance. This includes promoting collaboration and engagement, encouraging practice and projects, providing effective feedback, and fostering discipline and responsibility.

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- Involving Parents and Guardians as Supporters: Collaboration between parents, guardians, teachers, and schools can strengthen students' academic performance. Organizing school-home communication meetings, providing guidance for parents at home, and conducting educational workshops for parents can be beneficial.

- Utilizing Extracurricular Activities: Organizing educational trips, field trips, cultural and artistic events, and offering educational opportunities outside the classroom can enhance students' academic knowledge and increase their motivation and enthusiasm.

- Providing Counseling and Guidance Programs: Offering counseling and guidance services in areas such as career choices, psychological issues, family matters, and adjustment can facilitate improvements in students' academic performance.

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