ADVANCES IN GLOBAL EDUCATION AND RESEARCH

GLOCER'21

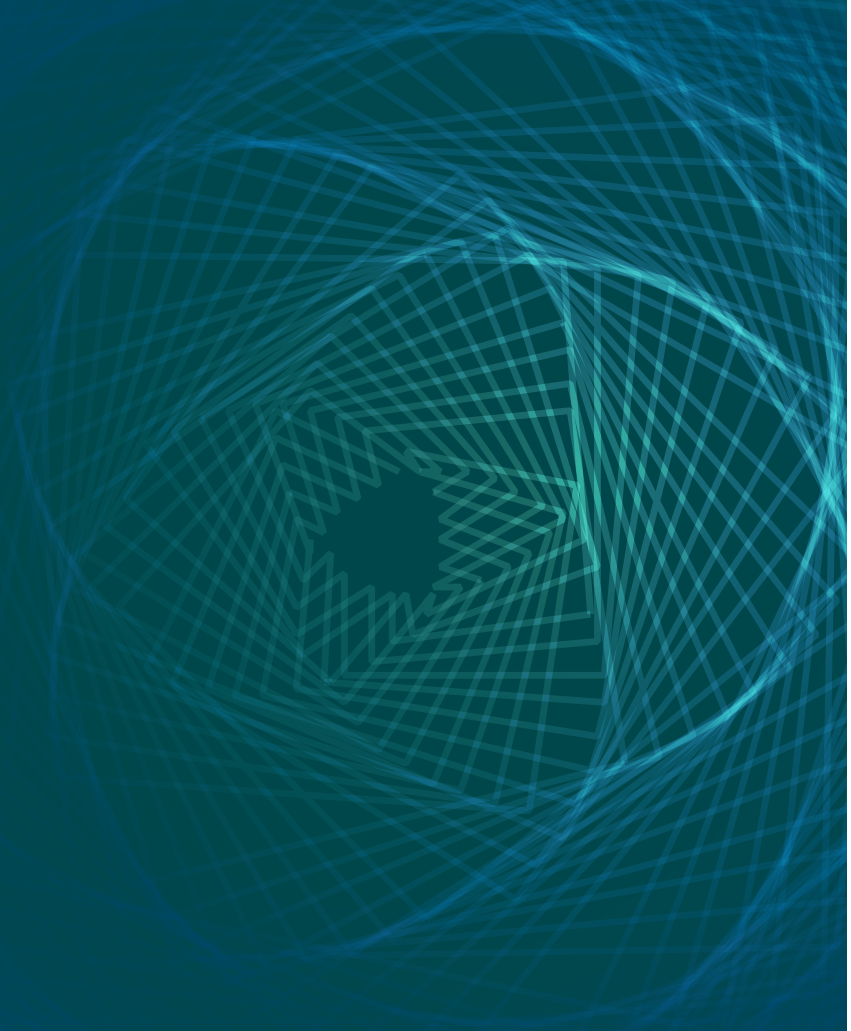
VOLUME 4

Editors:

Dr. Waynne B. James

Dr. Cihan Cobanoglu

Dr. Muhittin Cavusoglu



Co-Editors

***Dr. Waynne James*,** University of South Florida, USA
Dr. Cihan Cobanoglu, University of South Florida, USA
Dr. Muhittin Cavusoglu, Northern Arizona University, USA

ADVANCES IN GLOBAL EDUCATION AND RESEARCH: VOLUME 4

ISBN 978-1-955833-04-2

Authors are fully responsible for corrections of any typographical, copyrighted materials, technical and content errors.

https://digitalcommons.usf.edu/m3publishing/vol3/iss2021/7
DOI: https://www.doi.org/10.5038/9781955833042

Co-Editors

Dr. Waynne James, University of South Florida, USA
Dr. Cihan Cobanoglu, University of South Florida, USA
Dr. Muhittin Cavusoglu, Northern Arizona University, USA

ISBN 978-1-955833-04-2

This imprint is published by USF M3 Publishing, LLC
The registered company address is University of South Florida, 8350 N Tamiami Tr, Sarasota, FL 34243 USA.

Assistant Editor

Dr. Alia Hadid, University of Rhode Island, USA

Editor Assistants

Zahra Alrushdy**,** Bahcesehir University, Turkey
Gokhan Sener, Necmettin Erbakan University, Turkey
Abraham Terrah, University of South Florida, USA

****Authors are fully responsible for corrections of any typographical, copyrighted materials, technical and content errors.***

https://digitalcommons.usf.edu/m3publishing/vol3/iss2021/7
DOI: https://www.doi.org/10.5038/9781955833042

The Relationships Between Instructional Clarity, Classroom Management and Mathematics Achievement: Mediator Role of Attitudes Towards Mathematics

Saadet Aylin Yagan

College of Education
Tokat Gaziosmanpasa University, Turkey

Abstract

The purpose of this study is to investigate the relationships between teachers' classroom management and instructional clarity skills, and students' mathematics achievement as well as the mediator role of students' attitudes towards mathematics in these relationships. The sample consisted of 3536 fourth grade and 3678 eighth grade students who participated in TIMSS 2019 from Turkey. Based on theory, a saturated model was created, and it was focused on estimates and R squares. According to the results, for both fourth and eighth grades, all paths were statistically significant. That means direct effects of attitude, instructional clarity, and classroom management, along with indirect effects of instructional clarity and classroom management on math achievement are statistically significant at .01 significance level. Attitude partially and significantly mediates instructional clarity and classroom management. As teachers' instructional clarity and classroom management skills and students' attitudes towards mathematics increase, mathematics achievement also increases. For fourth grades, the model explains 27% of the variance in attitude (R square = .271), and 9% of the variance in mathematics achievement (R square = .094). For eighth grades, the model explains 20% of the variance in attitude (R square = .202), and approximately 8% of the variance in mathematics achievement (R square = .078).

Keywords: attitudes towards math, classroom management, instructional clarity, mathematics achievement, TIMSS 2019

Recommended Citation: Yagan, S. A. (2021). The relationships between instructional clarity, classroom management and mathematics achievement: Mediator role of attitudes towards mathematics. In W. B. James, C. Cobanoglu, & M. Cavusoglu (Eds.), *Advances in global education and research* (Vol. 4, pp. 1–11). USF M3 Publishing.
https://www.doi.org/10.5038/9781955833042

Introduction

Learning and teaching activities will only be effective if there is good communication between student and teacher (Orhan-Goksun & Askim-Kurt, 2017). Teachers are primarily responsible for the organization, planning, implementation, and evaluation of educational activities in accordance with the aims of education. They are expected to have pedagogical and field knowledge, to be able to organize the learning environment considering students' needs, to use contemporary teaching methods, and to create supportive and well-disciplined classrooms. Teachers' level of having those skills affects the learning climate as well as motivations, attitudes, and academic achievements of students (Bozan & Ekinci, 2020; Gurultu, Aslan & Alcı, 2018; Sezer, 2018). For this reason, it is thought that revealing the relationships between

teaching and classroom management skills of teachers, and attitudes towards lessons and academic achievements of students will be important in providing a more quality learning environment and increasing academic success.

Literature Review

Teaching or instructional skills are the competencies of teachers to organize the teaching-learning environment and to carry out the teaching process taking into consideration the needs and characteristics of their students (Incik-Yalcın, 2020). A teacher competent in teaching should have the skills to use teaching materials appropriately and to be aware of individual differences. They should know how learning occurs, how students acquire knowledge and skills, and which approaches, methods and techniques should be used to achieve effective learning. In addition, teachers should include students in the learning process effectively and use repetition and feedback to ensure understanding (Turkish Republic Ministry of National Education, 2017). Studies conducted at various educational levels in the literature indicate that there is a relationship between instructional skills and academic achievement. Bakar (2018) investigated the relationship between teachers' professionalism which includes teachers' pedagogical, professional, social, and personal competence, and students' academic achievements in a study conducted with vocational school students. As a result, a significant relationship was found between the two variables. Gess-Newsome, Taylor, Carlson, Gardner, Wilson, and Stuhlsatz (2017) conducted a study at the high school level and examined the relationship between teacher skills, teacher practice, and students' academic achievements. They have found a significant relationship between academic content knowledge which is a part of teacher skills and academic achievement. Kim and Seo (2018) examined the relationship between teacher efficacy and students' academic achievements with a meta-analysis study. In the study, the overall effect size between the two variables was found to be small but statistically significant. In the same study, it was found that the relationship between teacher efficacy and academic achievement did not differ in terms of teachers' classroom management skills. Muntaner-Mas, Vidal-Conti, Sesé, and Palou (2017) found a significant relationship between scholars' teaching skills and university students' academic achievement. These results show that there is a positive relationship between the teaching skills of the teachers and the academic achievements of the students. Teachers' teaching skills also interact with pedagogy and technology knowledge, communication skills, and classroom management skills (Orhan-Goksun, 2016).

Classroom management, the second variable of this study, can be defined as creating a positive classroom climate, and managing student behaviors and instruction in order to provide a more effective teaching-learning environment (Emmer & Stough, 2001). According to Evertson and Weinstein (2006) "classroom management has two distinct purposes: It not only seeks to establish and sustain an orderly environment so students can engage in meaningful academic learning, it also aims to enhance students' social and moral growth" (p 4). Students' undesirable behaviors such as making noise in the classroom, obstructing teaching activities, disturbing their friends, and threatening security will negatively affect learning environment (Goker & Dogan, 2016). There is a significant relationship between students' level of exhibiting such undesirable behaviors and effective classroom management skills of teachers (Kayikci, 2009). Teachers' classroom management skills determine their ways of handling undesirable behaviors and structuring instruction by affecting their communication with students (Alberto & Troutman, 2003). Ustun, Bozkurt, Bayar, & Sungurtekin (2017), as a result of their interviews with primary

https://digitalcommons.usf.edu/m3publishing/vol3/iss2021/7
DOI: https://www.doi.org/10.5038/9781955833042

school teachers, concluded that teachers' classroom management skills are shaped by students' attitudes towards lesson and academic achievements. Nisar, Khan, and Khan (2019) emphasized in their high school level study that there is a strong and positive relationship between teachers' classroom management skills and student achievement.

Another variable of this research is the attitudes towards lessons. Attitude can be defined as "the individual's respond tendency to any situation, event or object" (Temizkan, 2008, p. 462). Students' reactions to lessons or feelings about lessons are among the most important variables in teaching (Bloom, 2012). In literature, the studies about attitudes generally focus on the effects of modern teaching methods and techniques on student attitudes (see Gurer & Aslan, 2017; Oc, 2019; Sirakaya & Sirakaya, 2018; Sahin & Akbaba, 2018; Tasyürek, 2017; Yazicioglu & Cavus-Gungoren, 2019). However, it is thought that students' attitudes will be affected not only by methods and techniques but also by teaching and classroom management skills of teachers. As a matter of fact, Blazar & Kraft (2016) and Blazar (2018) concluded that a positive classroom climate created by teachers, teachers' sensitivity to students, and their instructional clarity skills are significantly associated with students' attitudes. In literature, it has also been investigated the relationship between attitude and academic achievement (see Etlioglu & Tekin, 2020; Genc & Kaya, 2011; Kazazoglu, 2013). According to those studies' results, there is a relationship between the two variables.

Based on the literature, a theoretical model (Figure 1) was created and tested in this study, which predict there are positive relationships between teaching and classroom management skills of teachers and academic achievement of students. Also, it is assumed that attitude towards lesson have mediator roles in these relationships. Since one of the most important purposes of educational activities is to enhance students' achievements, it is thought to be important to investigate the variables that affect student achievement. The model established in this study was tested on Trends in International Mathematics and Science Study (TIMSS) 2019 research results. TIMSS is an international research conducted by the International Education Achievement Assessment Organization (IEA) every four years since 1995. TIMSS aims to evaluate the achievements of fourth and eighth grade students in mathematics and science and to make comparisons between countries. In TIMSS research, besides math and science achievement scores, data of different variables which are thought to have an impact on success such as student background, teacher background, home background are also collected. In this research, TIMSS 2019 Turkey mathematics data and the scales of instructional clarity, classroom management and attitudes towards math were used. The hypotheses of this research are below. The same hypotheses were tested for fourth and eighth grades.

1) There is a positive relationship between instructional clarity and classroom management
2) There is a positive relationship between instructional clarity and attitudes towards mathematics
3) There is a positive relationship between instructional clarity and mathematics achievement.
4) There is a positive relationship between classroom management and attitudes towards mathematics
5) There is a positive relationship between classroom management and mathematics achievement
6) Attitude towards mathematics has a mediator role between instructional clarity and mathematics achievement.
7) Attitude towards mathematics has a mediator role between classroom management and mathematics achievement.

Methods

In the methodology section, the sample of the research was introduced, the characteristics of data collection tools (three scales and an achievement test) were explained, data sources, data analysis techniques and the path model tested were described.

Sample

In this study, TIMSS 2019 Turkey fourth and eighth grade mathematics data were used. 4028 students in fourth grade and 4077 students in eighth grade from Turkey participated in TIMMS 2019, but for this study, the data of 3536 students in fourth grade and 3678 students in eighth grade were used. The reason of that some of the students did not answer all or part of the instructional clarity, classroom management, and attitudes towards math scales. In TIMSS 2019, which has a scale average of 500, the fourth grade Turkey average was 523 and the eighth grade Turkey average was 496. Turkey ranks 23rd among 58 countries at fourth grade level and 20th among 39 countries at eighth grade level. Average scores of female and male students are 521 and 525 in fourth grades, and 501 and 490 in eighth grades respectively.

Data Collection Tools

The scales of instructional clarity, classroom management, and attitudes towards math have been in Student Questionnaire and were obtained from IEA website. Mathematics achievement data set were also downloaded from the same website. Details about the scales and the mathematics achievement test are below.

Instructional Clarity Scale (IC)

In this scale, instructional clarity skills of teachers are measured according to student perceptions. The scale has six items at fourth grade level and seven items at eighth grade level. It has a 4-point Likert-type scale ranging from 1 (agree a lot) to 4 (disagree a lot). The scale includes items such as "My teacher is easy to understand", "My teacher is good at explaining mathematics". At eighth-grade level, the item "My teacher links new lessons to what I already know" is additionally included. There is no reverse-coded item in the scale. The low score obtained from the scale indicates a high level of instructional clarity perception. The Cronbach alpha internal consistency coefficients of the scale were calculated as .70 for fourth grades and .85 for eighth grades.

Classroom Management Scale (CM)

In this scale, teachers' classroom management skills are measured according to student perceptions. The scale has six items and a 4-point Likert-type scale ranging from 1 (every or almost every lesson) to 4 (never). Sample items of the scale are "My teacher has to wait a long time for students to quiet down", "Students interrupt the teacher". There is no reverse coded item. The high score obtained from the scale indicates a high level of classroom management perception. Cronbach alpha internal consistency coefficients of the scale were calculated as .83 for fourth grades and .87 for eighth grades.

https://digitalcommons.usf.edu/m3publishing/vol3/iss2021/7
DOI: https://www.doi.org/10.5038/9781955833042

Attitudes Towards Math Scale (ATM)

This scale aims to measure students' attitudes towards mathematics lesson. It has nine items and a 4-point Likert-type scale ranging from 1 (agree a lot) to 4 (disagree a lot). The scale includes items such as "I like mathematics", "Mathematics is boring". Two items in the scale were reverse-coded because they indicated negative expressions. Low scores on the scale show a high level of positive attitude. Cronbach alpha internal consistency coefficients of the scale were calculated as .89 for fourth grades and .92 for eighth grades.

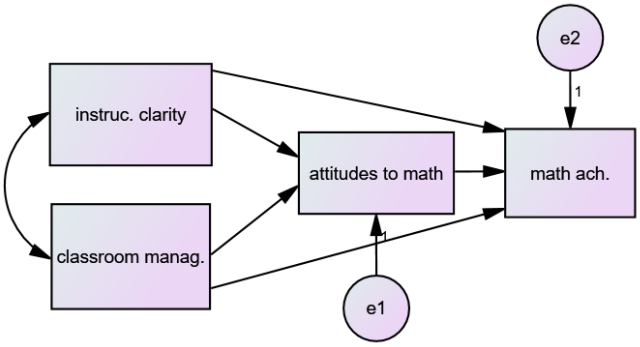
Mathematics Achievement Test (MA):

Mathematics achievement scores in TIMSS 2019 cover three learning areas (numbers, measurement and geometry, and data) for fourth grades and four learning areas (numbers, algebra, geometry, and data and probability) for eighth grades. For both fourth and eighth grades, the questions were prepared in accordance with the cognitive domains of knowing, applying, and reasoning. Item Response Theory was used to calculate mathematics achievement scores and five different plausible scores were calculated for each student in order to how contextual information is related to achievement (Davier, 2020; Mullis, Martin, Goh, & Cotter, 2016). A low score in the attitude towards math and instructional clarity scales indicates positive perception; on the contrary, a high score in the classroom management scale indicates positive perception. While interpreting the results of the study, this situation was considered.

Procedure

In this research, first, SPSS file was created by merging Turkey data with the help of IDB Analyzer accessed from the IEA website. Then, the missing data were removed using the listwise delete method. Cronbach alpha internal consistency coefficients for the three scales were calculated. The average scores of the scales and the average scores of the five plausible values of math achievement were calculated. The theoretical path analysis model in Figure 1 was created by using the AMOS 22.0. Since the model is saturated, meaning that df = 0, Chi square = 0, the model fit indices have not been reported and it has been focused on estimates, R squares and mediation effects. The same model has been tested separately for fourth and eighth grades. Before the path analysis results, correlations between variables and descriptive statistics were presented.

Figure 1. Theoretical Path Analysis Model



Findings

Correlations and Descriptive Data

Pearson correlation coefficients, means and standard deviations, and squared multiple correlations regarding the variables are in Table 1.

Table 1. Correlations, Descriptive Statistics and Squared Multiple Correlations

	Variables	1	2	3	4	*Mean*	*SD*	*R2*
4.grades	1.Instructional clarity	1				1.37	.47	
	2.Classroom management	-.153**	1			2.60	.83	
	3.Attitudes towards math	.506**	-.198**	1		1.49	.63	.271
	4.Math achievement	-.278**	.158**	-.204**	1	528	93.90	.094
	Variables	**1**	**2**	**3**	**4**	***Mean***	***SD***	
8.grades	1.Instructional clarity	1				1.46	.57	
	2.Classroom management	-.161**	1			2.75	.82	
	3.Attitudes towards math	.447**	-123**	1		2.08	.82	.202
	4.Math achievement	-.208**	.091**	-.254**	1	496	104.43	.078

***p<.01*

As can be seen in Table 1, all of the bivariate correlations between the four variables are statistically significant at .01 level. For fourth grades, the highest correlation is between instructional clarity and attitudes towards math. There is a positive and moderate correlation between those two variables (r = .506). Correlations between other variables are low (r = -.153; r = .158; r = -.198; r = -.204; r = -.278). Relationships between all variables in the model are positive. As instructional clarity, classroom management and attitude towards math increase, mathematics achievement also increases.

There is a similar pattern at eighth grade level. The highest correlation at this grade is also between instructional clarity and attitude towards math. There is a positive and moderate correlation between the two variables (r = .447). Correlations between other variables are low (r = -.153; r = .158; r = -.198; r = -.204; r = -.278). The relationships between all variables are positive. As instructional clarity, classroom management and attitude towards math increase, mathematics achievement also increases.

Instructional clarity, classroom management, and attitudes towards math scale means for fourth grade are at moderate level (M = 1.37, SD = .47; M = 2.60, SD = .83; M = 1.49, SD = .63). The mathematics achievement score of fourth grade sample of this study was calculated as 528 (SD = 93.9). Similarly for eighth grades, instructional clarity, classroom management, and attitudes towards math scale means are at moderate level (M = 1.46, SD = .57; M = 2.75, SD = .82; M = 2.08, SD = .82). Mathematics achievement score of eighth grade sample of this study was calculated as 496 (SD = 104.4).

The model for the fourth grades has explained 27% (R square =, 271) of the variance in attitudes towards math and 9% (R square =, 094) of the variance in mathematics achievement. For the eighth grades, the model has explained 20% (R square =, 202) of the variance in attitudes towards math and about 8% of the variance in mathematics achievement (R square =, 078).

https://digitalcommons.usf.edu/m3publishing/vol3/iss2021/7
DOI: https://www.doi.org/10.5038/9781955833042

The model in Figure 1 has been tested with the maximum likelihood method, and standardized direct and indirect effects were calculated. In order to test the significance of indirect effects, bootstrapping with 2000 sample was applied (see. Shrout & Bolger, 2002). The results of the analysis are in Table 2 and Table 3.

Table 2. Standardized Regression Coefficients

Variables		***β***	**Standard Error**	**Critical Ratio**
4. grades	ATM←IC	,487***	,019	33,52
	ATM←CM	-,124***	,011	-8,51
	MA←CM	,110***	1,861	6,72
	MA←IC	-,227***	3,678	-12,19
	MA←ATM	-,067***	2,813	-3,59
Variables		*β*	*Standard Error*	*Critical Ratio*
8. grades	ATM←IC	,438***	,022	29,37
	ATM←CM	-,053***	,015	-3,53
	MA←CM	,049***	2,037	3,04
	MA←IC	-,111***	3,260	-6,24
	MA←ATM	-,198***	2,245	-11,15

****p<.001*

Table 2 shows the beta coefficients, standard errors, and critical ratios of the model. All paths in the model at both grade levels are statistically significant. Beta coefficients indicate direct effects in the model. At fourth grade level, instructional clarity and classroom management variables have a significant and positive effect on attitudes towards math and mathematics achievement, but the effect of instructional clarity is larger ($\beta = .487$, $p < .001$; $\beta = -.227$, $p < .001$; $\beta = -.124$, $p < .001$; $\beta = .110$, $p < .001$). Likewise at eighth grade level, instructional clarity and classroom management variables have a significant and positive effect on attitudes towards math and mathematics achievement. The effect of instructional clarity is larger than classroom management ($\beta = .438$, $p < .001$; $\beta = -.111$, $p < .001$; $\beta = -.053$, $p < .001$; $\beta = .049$, $p < .001$).

The mediator effects of attitudes towards math in the model was examined and results were presented in Table 3. In order to determine the mediator effect standardized direct and standardized indirect effects and the significance of them were tested.

Table 3. Standardized Direct and Indirect Effects

Variables		Direct effects	Indirect effects	95% CI of Indirect effects		Results
				LB	***UB***	
4. grades	CM→ATM→ MA	,110***	,008***	.004	.014	Partial mediation
	IC→ATM→ MA	-,227***	-.033***	-.052	-.015	Partial mediation
8. grades	CM→ATM→ MA	.049***	,010***	.005	.017	Partial mediation
	IC→ATM→ MA	-.111***	-.087***	-.103	-071	Partial mediation

****p<.001*

Table 3 shows that the direct effects of classroom management and instructional clarity on mathematics achievement at both grade levels are statistically significant. Indirect effects of those two variables over attitudes towards math are also statistically significant. Therefore,

attitudes towards math have partial mediator roles in the relationships between instructional clarity and mathematics achievement; and classroom management and mathematics achievement for both fourth and eighth grades.

Conclusions

The research results have supported all hypotheses established. Positive and significant relationships were found between the four variables in the study. Studies in the literature support these findings. Akey (2006) concluded in her study that teacher support, teacher's academic and behavioral competence, and a positive classroom environment increase student attitude and achievement. Dogan and Bozok (2010), in their study comparing TIMSS 1999 and TIMSS 2007 Turkey data, found that attitude was a significant predictor of student achievement in TIMSS 2007 data. Koca (2011) stated that being satisfied with the teacher has a significant effect on the attitudes towards mathematics and mathematics achievement of eighth grade students.

Correlations and standardized regression coefficients show that the strongest relationship is between instructional clarity and attitudes towards math at both grade levels. On the other hand, fourth and eighth grades differ in terms of the relationships between mathematics achievement and other variables. Instructional clarity has the highest and attitudes towards math has the lowest relationship between mathematics achievement at fourth grades. Conversely attitudes towards math has the highest and classroom management has the lowest relationship with mathematics achievement for eighth grades. As students grew, attitudes towards math became more significant than instructional clarity. Mata, Monteiro & Peixoto (2012), in their study with students from fifth to 12th grade, found that students' attitudes towards mathematics were moderate, and age significantly differentiated attitudes towards mathematics. The change in attitudes towards math with age may also has differentiated its effect on academic achievement. In the same study, supporting of this research, significant relationships were found between teacher support and attitude towards math, and attitudes towards math and mathematics achievement.

In the study, it was determined that attitude towards math has a partial mediator role between both classroom management and mathematics achievement, and instructional clarity and mathematics achievement. According to statistics, although the mediator effect is not large, it is significant. For this reason, while organizing teaching activities, considering the students' attitudes towards mathematics along with instructional clarity and classroom management will have a positive effect on increasing mathematics achievement. Supporting this result, Willis (2010) states that teaching strategies and teaching skills of teachers and a supportive classroom environment affect attitudes towards math; and attitudes towards math affects mathematics achievement.

If a teacher feels inadequate in teaching math, it will affect the entire classroom climate. A teacher who does not master the lesson enough will experience a failure to adjust the time devoted to topics, will not have the opportunity to take care of low achievers, and will feel nervous. All these negativities will not only affect mathematics achievement, but also affect students' attitudes towards mathematics (Bruning, Schraw, & Ronning, 1999; Sottile, Carter & Murphy, 2002). This research findings also support this conclusion. According to the results, teachers should be trained in terms of how they can be more explicit and understandable while

https://digitalcommons.usf.edu/m3publishing/vol3/iss2021/7
DOI: https://www.doi.org/10.5038/9781955833042

teaching mathematics, and classroom management skills. With the decision of the Higher Education Council (2020) in Turkey, universities have become responsible for the organization of teacher training curricula. In those curricula, it is recommended to focus on how to teach mathematics and classroom management skills according to age group characteristics besides content knowledge.

References

Akey, T. (2006). School context, students attitudes and behavior and academic achievement: An exploratory analysis (January Report). MDRC. Retrieved from: https://files.eric.ed.gov/fulltext/ED489760.pdf

Alberto, P. A., & Troutman, A. C. (2003). Applied behavior analysis for teachers (6th ed.). Upper Saddle River, NJ: Pearson.

Bakar, R. (2018). The influence of professional teachers on Padang vocational school students' achievement. Kasetsart Journal of Social Sciences, 39(1), 67-72. Doi: 10.1016/j.kjss.2017.12.017

Blazar, D. (2018). Validating teacher effects on students' attitudes and behaviors: Evidence from random assignment of teachers to students. Education Finance and Policy, 13(3), 281-309. Doi: 10.1162/edfp_a_00251

Blazar, D., & Kraft, M. A. (2016). Teacher and teaching effects on students' attitudes and behaviors. Educational Evaluation and Policy Analysis, 39(1), 146 170. Doi:10.3102/0162373716670260

Bloom, B. S. (2012). İnsan nitelikleri ve okulda öğrenme. D. A. Özçelik (Trans.). Ankara: Pegem.

Bozan, S., & Ekinci, A. (2020). Evaluation of teachers' views on problems in classroom management in their early years. Kastamonu Education Journal, 28(1), 137-153. Doi:10.24106/kefdergi.3480

Bruning, R. H., Schraw, G. J., & Ronning, R. R. (1999). Cognitive psychology and instruction (3rd ed.). Upper Saddle River, NJ: Prentice Hall.

Davier, M. (2020). TIMSS 2019 scaling methodology: Item response theory, population models, and linking across modes (p.526-551). In M. O. Martin, M. Davier, I. V.S. Mullis (Eds.). Methods and procedures: TIMSS 2019 technical report: TIMSS & PIRLS International Study Center, Lynch School of Education and Human Development, Boston College, and IEA.

Dogan, N., & Barıs, F. (2010). Tutum, değer ve öz-yeterlik değişkenlerinin TIMSS-1999 ve TIMSS-2007 sınavlarında öğrencilerin matematik başarılarını yordama düzeyleri. Journal of Measurement and Evaluation in Education and Psycholog, 1(1), 44-50. Retrieved from: https://dergipark.org.tr/en/pub/epod/issue/5808/77253

Emmer, E., & Stough, L. (2001). Classroom management: A critical part of educational psychology, with implications for teacher education. Educational Psychologist, 36,103-112. Doi: 10.1207/S15326985EP

Etlioglu, M., & Tekin, M. (2020). The mediating role of student's curiosity and anxiety in the relationship between student attitude and academic achievement in electronic learning. Selcuk Üniversitesi Sosyal Bilimler Enstitüsü Dergisi, 43, 34-48. Retrieved from: http://dergisosyalbil.selcuk.edu.tr/susbed/article/view/1682/1285

Evertson, C. M., & Weinstein, C. S. (2006). Classroom management as a field of inquiry. In C. M. Evertson & C. S. Weinstein (Eds.), Handbook of classroom management: Research, practice, and contemporary issues (pp. 3 -16). Mahwah, NJ: Lawrence Erlbaum Associates.

Genc, G., & Kaya, A. (2011). Sınıf öğretmeni adaylarının yabancı dil derslerine yönelik tutumları ile yabancı dil akademik başarıları arasındaki ilişki. Balıkesir Üniversitesi Sosyal Bilimler Enstitüsü Dergisi, 14(26), 19-30. Retrieved from: https://dergipark.org.tr/en/pub/baunsobed/issue/50197/646418

Gess-Newsome, J., Taylor, J. A., Carlson, J., Gardner, A. L., Wilson, C. D., & Stuhlsatz, M. A. M. (2017). Teacher pedagogical content knowledge, practice, and student achievement. International Journal of Science Education, 41(7), 944-963. Doi:10.1080/09500693.2016.1265158

Gokyer, N., & Dogan, B. (2016). İstenmeyen öğrenci davranışları ve nedenlerine ilişkin yönetici ve öğretmen görüşleri. Fırat Üniversitesi Sosyal Bilimler Dergisi, 26(1), 93-106. Retrieved from: https://dergipark.org.tr/tr/pub/firatsbed/issue/22124/237639

Gurer, B., & Arslan, N. (2017). Din Kültürü ve Ahlak Bilgisi Dersinde eğitsel oyun yöntemi ile öğretimin öğrenci başarısına ve derse tutumuna etkisi. Değerler Eğitimi Dergisi, 15(34), 87-127. Retrieved from: https://dergipark.org.tr/en/pub/ded/issue/37287/430586

Gurultu, E., Aslan, M., & Alci, B. (2018). Investigation of elementary school teachers' qualifications in the light of 21st century skills. The Journal of Academic Social Sciences, 6(71). Sf. 543-560. Doi: 10.16992/ASOS.13770

Incik-Yalcın, E. (2020). Öğretmenlerin yaşam boyu öğrenme eğilimleri ve 21. yüzyıl öğreten becerileri arasındaki ilişkinin incelenmesi. Bolu Abant İzzet Baysal Üniversitesi Eğitim Fakültesi Dergisi, 20(2), 1099-1112. Doi: 10.17240/aibuefd.2020..-638602

Kayikci, K. (2009). The effect of classroom management skills of elementary school teachers on undesirable discipline behavior of students. Procedia Social and Behavioral Sciences, 1, 1215-1225. Doi:10.1016/j.sbspro.2009.01.218

Kazazoglu, S. (2013). The effect of attitudes towards Turkish and English courses on academic achievement. Education and Science, 38(170), 294-307. Retrieved from: http://egitimvebilim.ted.org.tr/index.php/EB/article/view/2123

Kim, K. R., & Seo, E. H. (2018). The relationship between teacher efficacy and students' academic achievement: A meta-analysis. Social Behavior and Personality, 46(4), 529-540. Doi:10.2224/sbp.6554

Koca, S. (2011). İlköğretim 8. sınıf öğrencilerinin matematik başarı, tutum ve kaygılarının öğrenme stillerine göre farklılığının incelenmesi. (Unpublished master thesis) Afyon Kocatepe University Institution of Educational Sciences, Afyon.

Mata, M. L., Monteiro, V., & Peixoto, F. (2012). Attitudes towards mathematics: Effects of individual, motivational, and social support factors. Child Development Research. Doi:10.1155/2012/876028

Mullis, I. V. S., Martin, M. O., Goh, S., & Cotter, K. (Eds.). (2016). TIMSS 2015 encyclopedia: Education policy and curriculum in mathematics and science. Retrieved from: http://timssandpirls.bc.edu/timss2015/encyclopedia

Muntaner-Mas, A., Vidal-Conti, J., Sesé, A., & Palou, P. (2017). Teaching skills, students' emotions, perceived control, and academic achievement in university students: A SEM approach. Teaching and Teacher Education, 67(1), 1-8. Doi:10.1016/j.tate.2017.05.013

Nisar, M., Khan, I. A., & Khan, F. (2019). Relationship between classroom management and students' academic achievement. Pakistan Journal of Distance & Online Learning, 5(1), 209-220. Retrieved from: https://files.eric.ed.gov/fulltext/EJ1266806.pdf

Oc, U. (2019). Argümantasyona dayalı fen laboratuvarı uygulamalarının bilimsel süreç becerileri, laboratuvara yönelik tutum ve yaratıcılığa etkisi. (Unpublished master thesis). Cumhuriyet University Institution of Educational Sciences, Sivas.

Orhan-Goksun, D. (2016). Öğretmen adaylarının 21. yy. öğrenen becerileri ve 21. yy. öğreten becerileri arasındaki ilişki. (PhD thesis). Eskisehir Anadolu University Institution of Educational Sciences, Eskisehir.

Orhan-Goksun, D., & Askim-Kurt, A. (2017). The relationship between pre-service teachers' use of 21st century learner skills and 21st century teacher skills. Education and Science, 42(190). Doi: 10.15390/EB.2017.7089.

Sahin, R., & Akbaba, U. (2018). Bilgisayar destekli öğretimin "Güneş Sistemi ve Ötesi, Uzay Bilmecesi" ünitesindeki öğrenci başarısına ve derse karşı öğrenci tutumuna etkisi. e-Kafkas Journal of Educational Research, 5(1), 10-24. Doi: 10.30900/kafkasegt.339721

Sezer, S. (2018). The effects of teachers' classroom management attitudes on students' development: A phenomenological analysis. Hacettepe University Journal of Education, 33(2), 534-549. Doi: 10.16986/HUJE.2017031319

Shrout, P., & Bolger, N. (2002). Mediation in experimental and nonexperimental studies: New procedures and recommendations. Psychological Methods, 7, 422–445. Doi: 10.1037//1082-989X.7.4.422

Sirakaya, M., & Alsancak-Sirakaya, M. (2018). The effect of augmented reality use in science education on attitude and motivation. Kastamonu Education Journal, 26(3), 887-896. Doi:10.24106/kefdergi.415705

Sottile, J. M., Carter, W., & Murphy, R. A. (2002, April). The influence of self-efficacy on school culture, science achievement, and math achievement among inservice teachers. Paper presented at the annual conference of the American Educational Research Association, New Orleans, LA.

Tasyurek, Z. (2017). Sosyal bilgiler dersinde internet kullanımının öğrencelerin akademik başarılarına, bilgilerin kalıcılığına ve derse karşı tutumlarına etkisi. (PhD thesis). Atatürk University Institution of Educational Sciences, Erzurum.

Temizkan, M. (2008). Türkçe öğretmeni adaylarının öğretmenlik mesleğine yönelik tutumları üzerine bir araştırma. Türk Eğitim Bilimleri Dergisi, 6(3), 461-486. Retrieved from: https://dergipark.org.tr/tr/download/article-file/256311

https://digitalcommons.usf.edu/m3publishing/vol3/iss2021/7
DOI: https://www.doi.org/10.5038/9781955833042

Turkish Higher Education Council. (2020). YÖK'ten eğitim fakültelerinin müfredatlarına yönelik tarihi karar. Retrieved from: https://www.yok.gov.tr/Sayfalar/Haberler/2020/egitim-fak%C3%BCltelerine-yetki-devri.aspx

Turkish Republic Ministry of National Education. (2017). Öğretmenlik mesleği genel yeterlikleri. Ankara: Öğretmen Yetiştirme ve Geliştirme Genel Müdürlüğü.

Üstün, A., Bozkurt, E., Bayar, A., & Sungurtekin, D. (2017). Sınıf öğretmenlerinin uyguladığı sınıf yönetimi stratejilerinin öğrencilerin derslerine karşı tutumları ve akademik başarılarına etkisi üzerine bir çalışma. Avrasya Sosyal ve Ekonomi Araştırmaları Dergisi, 4(12), 756-769. Retrieved from: https://dergipark.org.tr/tr/download/article-file/982669

Willis, J. (2010). Learning to love math: Teaching strategies that change student attitudes and get results. ASCD.

Yazıcıoğlu, S., & Çavuş-Güngören, S. (2019). Investigate the effect of game-based activities on middle school students' science learning according to achievement, motivation, attitude, and gender variables. Necatibey Faculty of Education Electronic Journal of Science and Mathematics Education, 13(1), 389-413. Doi: 10.17522/balikesirnef.584673