

ROWAIDAH ALAYAN

Higer Studies of Israel

THE INFLUENCE OF SCHOOL PRACTICES ON ACADEMIC SELF-EFFICACY TOWARDS MATHEMATICS ACHIEVEMENT

ABSTRACT. Alayan Rowaidah, *The Influence of School Practices on Academic Self-Efficacy Towards Mathematics Achievement* [Wpływ praktyki szkolnej na kształtowanie samodzielnego osiągnięcia sukcesów w matematyce]. Studia Edukacyjne nr 51, 2018, Poznań 2018, pp. 491-502. Adam Mickiewicz University Press. ISSN 1233-6688. DOI: 10.14746/se.2018.51.30

The purpose of this article is to specify whether there is any influence of school practices towards mathematics self-efficacy and mathematics outcomes. The studies about the effect of school practice on student achievement have a long history both domestically and abroad. However, the investigation of how the social context of school and practices affect student performance is not clear, especially in mathematics. To investigate this, I will chose al-touri secondary school where I teach as a case-study for my research. The instrument use for the article will be based on a questionnaire, which contains 2 sections. Section 1 will contain "School Level Environment Questionnaire" (SLEQ). Section 2 will contain "Mathematic Self-efficacy Questionnaire" (MSEQ). The mathematic scores of students will be taken for the first and second semester to compare between them and to see if there is a significant relationship between school practices and mathematics self-efficacy and mathematics outcomes. The findings indicate that there is a significant difference in students' perception about their school practice and mathematic self-efficacy based on their achievement and according to ANOVA test, there is a relationship between school practices and mathematic self-efficacy. The result from this study can be generalized to the population of all schools in the Arab Sectors in Israel. Moreover, we can use the questionnaires obtained in the study to identify the strengths and weaknesses of schools in their teaching and learning process and to focus on improving their latter, at the same time maintaining the strength of their teaching strategies.

Key words: school practices, mathematic self-efficacy, school achievement

Introduction

Many factors could lead to difficulty in learning mathematic. Some of them are intrinsic or extrinsic form. An important extrinsic factor is the school practices, which have an essential role in external motivation, increasing self-

-efficacy, cognitive ability and anxiety level towards mathematics and mathematic outcomes.¹ So what is the role of school practices on the school outcomes? In addition, to what degree can school practices be held responsible for their outcomes? These questions were the core subjects of many researchers for many years. Opdenakker's (2007) model was the starting point for the investigation of the relations between school characteristics and school outcomes. These relations are interpreted in their influence of on class characteristics and by their influence on the relationship between class characteristics and achievement.

When we are talking about school characteristics, we take in consideration three kinds of characteristics: composition of schools (student population, teaching team, and school leader), characteristics referring to the school practice (educational framework organization and management, work and learning climate) and context characteristics (e.g. denomination, school size, study program offerings, facilities). School practice is influenced by school composition and school context. As mentioned, with respect to the school practice a distinction is made between the educational framework, the organization and management, and the work and learning climate. Between these characteristics of school, practice relationships are assumed.²

Meanwhile, according to Johns and Stevens³ (2005), school practices can be defined as "the learning environment for a school". The comprehensive view defines school practices in terms of four aspects of the school environment: A physical environment that is welcoming, and conducive to learning, A social environment that promotes communication and interaction, An effective environment that promotes a sense of belonging and self-esteem and An academic environment that promotes learning. According to these definitions, we can conclude that there is a strong relation between school environments and increasing the self- efficacy of the student as Freiberg⁴ (1998) notes, "school practice can be a positive influence on the health of the learning environment or a significant barrier to learning". Adapted from Bandura's (1977) general social cognitive theory,⁵ self- efficacy defines as "individuals' judgments and

¹ M. Taat, G. Rozrio, *The Influence of Learning Environment and Academic Self-Efficacy Towards Mathematics Achievement in Masterskill Global College Malaysia*, International Journal of Arts and Commerce, 2015, 4(2), p. 43-52.

² M.C. Opdenakker, J.V. Damme, *Do school context, student composition and school leadership affect school practice and outcomes in secondary education?* British Educational Research Journal, 2007, 33(2), p. 180-187.

³ B. Johnson, J.J. Stevens, *Student achievement and elementary teachers' perceptions of school climate*, Learning Environments Research, 2006, 2, p. 111-122.

⁴ H.J. Freiberg, *Measuring school climate: Let me count the ways*, Educational Leadership, 1998, 56(1), p. 22-26.

⁵ A. Bandura, *Self-efficacy: Toward a unifying theory of behavioral change*, Psychological Review, 1977, 84(2), p. 191-215.

beliefs about their abilities in succeeding certain tasks". So if people have little incentive to act if they believe that handling the task exceeds their capabilities, but they encourage to perform tasks if they believe that their actions can produce the desired outcomes.⁶

Self-efficacy relates to many areas, one of these areas is academic self-efficacy which define as "individuals' beliefs about their abilities to manage a set of tasks in order to reach the pre-determined kinds of performance."⁷ Academic self-efficacy plays an important role in succeeding in many academic fields, one of them is mathematics.

Mathematic self-efficacy has been defined as the believes about the student's ability to handle mathematic tasks, or a mathematical problem successfully.⁸ Pajares⁹ (1996) indicates that student with high level of confidence or self-efficacy attempt more to solve problems, and lead them to deal with mathematical calculations with more accuracy, whereas, individual with low self-efficacy has negative thoughts that make him hesitate to try again. Therefore, they set small goals for themselves.¹⁰ Therefore some research showed that mathematic self-efficacy has a significant role in mathematic achievement, individual with low level of self-efficacy, show a low-level performance in mathematics and vice versa.¹¹ This is relate to anxiety increase. Therefore, high level of anxiety influences individuals' behavior and leads to performance loss.¹² Mathematic anxiety is one of the common emotional and attitudinal factors, which have direct and indirect effects on all aspects of teaching and learning mathematics.¹³

Mathematics anxiety (MA) is generally defined as a state of discomfort, feelings of helplessness and stress caused by performing or dealing with

⁶ F. Pajares, *Overview of Social Cognitive Theory and Mathematical Problem Solving of Gifted Students*, Contemporary Educational Psychology, 2002, (20), p. 325-344.

⁷ J. Dorman, J. Adams, *Associations between students' perceptions of classroom environment and academic efficacy in Australian and British secondary schools*, Westminster Studies in Education, 2004, 27(1), p. 69-85.

⁸ M. Goose, R. Brown, K. Maker, *Self-Efficacy in mathematics: Affective Cognition, Cognitive Domains of Functioning*, Proceeding of the 21th Annual Conference of Mathematics Education Research Group of Australia 2008, p. 507-513.

⁹ F. Pajares, *Self-efficacy beliefs in academic settings*, Review of Educational Research, 1996, 66, p. 543-578.

¹⁰ M.D. Aid Suraya, W.A.N. Wan Zah, *Metacognition and Motivation in Mathematic Problem Solving*, The International Journal of Learning, 2009, (15), p. 121-132.

¹¹ K.A. Walsh, *The relationship among mathematics anxiety beliefs about mathematic, mathematics self-efficacy, and mathematic performance*, Nursing Education Research, 2008, 29(4), p. 226-229.

¹² M.K. Husu, S.W. Wang, K.K. Chiu, *Computer attitude statistics anxiety and self-efficacy on statistical software adoption behavior: an empirical study of online MSA Learners*, Computer and Human Behavior, 2009, (25), p. 412-420.

¹³ M. Baloglu, R. Kocak, *A multivariate investigation of the differences in mathematics anxiety*, Personality and Individual Differences, 2006, (40), p. 1325-1335.

mathematical tasks,¹⁴ MA can be manifested as feelings of apprehension, dislike, tension, worry, frustration and fear.¹⁵ Mathematic anxiety had a significant influence in disable mathematic understanding, transferring the mathematical tasks to its abstract form by making interference in the mental structures and information processing processes.¹⁶ Some studies considered that mathematic anxiety is a common and general problem for students.¹⁷

According to attitude theories such as Theory of Reasoned Action,¹⁸ individuals attitude toward the behavior are of the most important predictors of individuals' behavior and performance. Some research¹⁹ suggest that some students have a bad performance in mathematics is due to the anxiety and negative attitude toward this subject. Fennema's theory²⁰ explains the belief that that performance in mathematics is an interaction between attitudes, mathematic anxiety and behavior.

According to what we mention above, this study seeks to answer this question that "what are the direct and indirect effects of school practices on mathematic self- efficacy and mathematic outcomes of the student?" and whether this component can have the roles of mediators?"

Based on the above-mentioned facts, the main issue of the present research is to examine the existence of any relationship between school practices and mathematic self-efficacy and mathematic performance. In order to achieve this aim and predict the possibility of the existence of any relationship between the mention variables, a model was designed according to the research background and the direct and indirect effects of the research variables on mathematic outcomes. The primary model of the present research has been shown in figure 1.

¹⁴ X. Ma, J. Xu, *The causal ordering of mathematics anxiety and mathematics achievement: a longitudinal panel analysis*, *Journal of Adolescence*, 2004, 27, p. 165-179.

¹⁵ M.H. Ashcraft, K.S. Ridely, *Math anxiety and its cognitive consequences: a tutorial review*, [In:] *The Handbook of Mathematical Cognition*, Ed. J.I.D. Campbell, New York 2005, p. 315-327; Wigfield A., Meece J.L., *Math anxiety in elementary and secondary school student*, *Journal of Educational Psychology*, 1988, 80, p. 210-216.

¹⁶ S.H. Alamohodayi, *Mathematics anxiety*, *Journal of Psychology and Educational Sciences*, 2000, 5(1), p. 99-119.

¹⁷ F. Yuksel-Sahin, *Mathematics anxiety among 4th and 5th grade Turkish elementary school students*, *International Electronic Journal of Mathematic Education*, 2008, 3(3), p. 179-192.

¹⁸ L. Ajzen, M. Fishbein, *Attitude-behavior relations: a theoretical analysis and review of empirical research*, *Psychological Bulletin*, 1977, (84), p. 888-918.

¹⁹ M. Tapia, G.E. Marsh, *An Instrument to Measure Mathematics Attitude*, *Academic Exchange Quarterly*, 2004, 8(2).

²⁰ E. Fennema, *The Study of Affect and Mathematics: A Proposed Generic Model for Research*, [In:] *Affect and Mathematical Problem Solving*, Eds. D.B. Mcleod, V.M. Adams, New York 1989, p. 205-219.

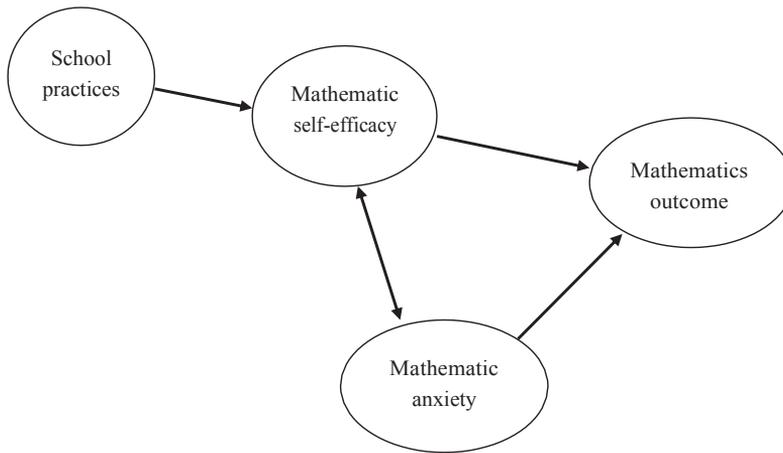


Fig. 1. The conceptual model of the research

According to figure 1 and based on Bandura’s Cognitive- Social theory, it is assumed that school practices has a direct effects on the two structures of mathematics self-efficacy and anxiety and how these variables also have a direct effect on mathematic scores. On the other hand, self- efficacy had also an effect on mathematic anxiety. The argument about the effect of learning environment on self-efficacy was the core study for many researchers.

For instance, Dorman²¹ which was a mathematic at secondary school in Australia found a positive relationship between the learning environment and academic self-efficacy. Similarly, the analysis of Anderson’s data²² (2004)²² showed a positive relationship between academic self-efficacy and class environment, he explained that the supportive environment plays an essential role in increasing the academic self-efficacy. In social sciences, Dorma, Waldrip and Fisher’s²³ tried to investigate the effectiveness of class environment factor on academic self-efficacy and their attitude toward science. Finally, it was found that the four hundred and forty nine students in different secondary schools were have a strong positive predictors for the relationship between class environment and academic self efficacy and their attitude to science.

²¹ J.P. Dorman, *Associations between classroom environment and academic efficacy*, Learning Environments Research, 2001, 4(3), p. 243-257.

²² L. Anderson, *From chaos to community*, 2004. Retrieved from <https://www.tolerance.org/classroom-resources/tolerance-lessons/from-chaos-to-community>.

²³ J. Dorman, B. Waldrip, D.L. Fisher, *Classroom environment, students’ perceptions of assessment, academic efficacy and attitude to science: A LISREL analysis*, In proceedings of the NARST 2006 Annual Meeting, National Association for Research in Science Teaching.

Another study was carried out in the USA and Hong Kong by Hanke's²⁴ about the influence of learning environment on mathematic self-efficacy and attitudes towards mathematics. The result indicated significant positive correlation between learning environment and academic self-efficacy and attitudes towards mathematics. Another study looking for the relationship between learning environment and students self-efficacy in mathematics was conducted by Zedan and Bitar²⁵ (2014) with 900 high school students in Israel. The result for the questionnaires was found the mathematical self-efficacy was effective in predicting achievements in mathematics.

The studies about the effect of school practice on student achievement have a long history both domestically and abroad. However, the investigation of how the social context of school and practices affect on student performance is not clear. Researchers who studied variations in schooling environments began to uncover associations between organizational structure and climate of schools and student- achievement levels,²⁶ whereas other investigations and reviews indicate that student characteristics and schooling contexts were the primary components of student academic performance.²⁷

In the middle of 1980s, the development of multilevel modeling techniques led to a change in the way that school effects were investigated. Because of that, many researchers documented relationships between characteristics of the schooling environment (e.g. curricular structure, academic press, staff commitment) and student achievement levels.²⁸

Another approach to examining school effects on student achievement levels was conducted by Abu bakar N. & Usaini I.M.²⁹ to examine how school environment influence students academic performance on secondary

²⁴ C.Y.C. Hanke, *A cross-national study of students' perceptions of mathematics classroom environment, attitudes towards mathematics and academic self-efficacy among middle school students in Hong Kong and the USA* (Doctoral dissertation, Curtin University), 2013, Retrieved from https://espace.curtin.edu.au/bitstream/handle/20.500.11937/2575/199177_Hanke%22%2014.pdf?sequence=2

²⁵ R. Zedan, J. Bitar, *Environment learning as a predictor of mathematics self-efficacy and math achievement*, American International Journal of Social Science, 2014, 3(6), p. 85-97.

²⁶ W. Brookover et al., *School social system and student achievement – school can make a difference*, New York 1979; Coleman J.S., Hoffer T., Kilgore S., *Cognitive outcomes in public and private schools*, Sociology of Education, 1982, 55, p. 65-76; E.L. Mc Dill, L.C. Rigsby, *Structure and process in secondary schools: the academic impact of educational climates*, Baltimore 1973.

²⁷ Hanushek E.A., *The economics of schooling: Production and efficiency in public schools*, Journal of Economic Literature, 1986, 24, p. 1141-1177; Willms J.D., *Social class segregation and its relationship to pupils examination results in Scotland*, American Sociological Review, 1986, 51, p. 224-241.

²⁸ V.E. Lee, A.S. Bryk, *A multilevel model of the social distribution of high school achievement*, Sociology of Education, 1989, 62, p. 172-192; V.E. Lee, A.S. Bryk, J.B. Smith, *The organization of effective secondary schools*, Review of Research in Education, 1993, 19, p. 171-267.

²⁹ N. Abu bakar, M. Usaini, *The Influence of School Environment On Academic Performance of Secondary School Students in Kuala Terenddanu*, Malaysia International Conference on Empowering Islamic Civilization in 21th Century, Malaysia 2015, p. 252-261.

school students in Malaysia, the result of the survey for 377 participant indicates that school environment with a good teachers and favorable environment performed well than those from schools with fewer facilities, unqualified teachers and the less enabling environment. This result agrees with Daemi, M, Tahriri, A & Zafarghandi³⁰ results that examine the relationship between school environment and English as a Foreign Language (EFL) learners academic self-efficacy. The result of the survey reveals that there was a significant relationship between EFL learner's classroom environment and their self- efficacy.

Another study carried out by Taat & Rozario³¹ which aims to examine the influence of mathematics classroom environment towards students mathematics achievement. For this purpose, a sample of 200 college students was randomly selected. The result of the statistical procedures reported that there is a significant difference in respondents perception based on mathematic achievement grades. Moreover, different construct significantly influence achievement in mathematics.

Research project

The objectives of research projects are: 1) To determine the differences in student's perception of learning environment based on mathematics achievements; 2) To determine the differences in students perception of mathematic self efficacy based on mathematics achievements; 3) To determine the relationship between school practices with academic self- efficacy in mathematics; 4) To determine the influence of school practices towards academic self- efficacy in mathematics and mathematic achievement.

There were three hypothesis set in the research:

- 1) there is no significant difference in students perception of learning environment based on grades;
- 2) there is no significant difference in students perception of academic self- efficacy in mathematics based on mathematic achievement;
- 3) there is no relationship between learning environment and mathematic self- efficacy.

³⁰ M. Daemi, A. Tahriri, A.M. Zafarghandi, *The Relationship between Classroom Environment and EFL Learners Academic Self-Efficacy*, *International Journal of Education & Literacy Studies*, 2017, 5(4), p. 16-23.

³¹ M. Taat, G. Rozario, *The Influence of Learning Environment and Academic Self-Efficacy Towards Mathematics Achievement in Masterskill Global College Malaysia*, *International Journal of Arts and Commerce*, 2015, 4(2), p. 43-52.

Research method and instruments

The study is a quantitative approach with non-experimental design by using survey. 150 of 9th grade students in Al-Tori Secondary school for girls, which was selected from the school where I work. A combination of two sets of inventories that had been modified to suit the purpose of the study. They were the mathematic self-efficacy scale (MSES) for students, which consists mathematic self-efficacy scale. The second questionnaire what is happening in school questionnaire (WIHIS) which consists of ten scale factors; (a) learning environment (b) social environment (c) effective environment (d) academic . All instruments used five Likert Scale from Strongly Disagree-Strangly Agree.

Research results

Q1: Is there a significant difference in students perception of learning environment based on grades

According to the table below for the independent t-test, we can notice that the mean of the perception of learning environment in students with low mathematic achievements had slightly lower than compared to the mean of high-level achievement students. The p- value is $0.033 < 0.05$, so the null hypothesis was rejected and we can conclude that there is significant differences in the perceptions of learning environment based on mathematic achievement.

Learning environment independent t-test

Table 1

Level of Mathematic Achievement	Mean	SD	P-value
Low	3.480	0.400	0.033*
High	3.600	0.369	

Note: * indicates significance at 0.05 ($p < 0.05$).

Q2: Is there a significant difference in student's academic self-efficacy in mathematics based on mathematic achievement

The table 2 indicates that there is a significant difference in student's academic self- efficacy in mathematics ($p < 0.05$) for the students with high achievement compared to students with a low achievement.

Table 2

Mathematic self-efficacy independent t-test

Level of mathematic achievements	Mean	SD	P-value
Low	3.637	0.415	0.023*
High	3.786	0.478	

Note: * indicates significance at 0.05 ($p < 0.05$).

Q3: Is there a relationship between school practices and mathematic self-efficacy

In table 3, the two variables were positively correlated to one another with a quite low $r = 0.344$ $n = 150$, therefore the null hypothesis was rejected at 99% confidence level. This result suggested that there is significant positive relationship between school practices and academic self- efficacy.

Discussion

Results of independent samples t-test portrayed that both variables had a significant difference between students with low achievement and high achievement. The only similarity between the tests was students with high achievement had higher mean score on both variables as compared to those with low achievement. These findings suggested that students with high score had better perception on their learning environment, and more confident in solving mathematics problem.

When we talking about the correlation analysis, it was indicated that there is a positive relationship between school practices and mathematics self- efficacy, and this is agree to the findings of many researchers³². We can conclu-

³² J.P. Dorman, *Associations between classroom environment and academic efficacy*, Learning Environments Research, 2001, 4(3), p. 243-257; L. Anderson, *From chaos to community*, 2004. Retrieved from <https://www.tolerance.org/classroom-resources/tolerance-lessons/from-chaos-to-community>; J. Dorman, B. Waldrip, D.L. Fisher, *Classroom environment, students' perceptions of assessment, academic efficacy and attitude to science: A LISREL analysis*, In proceedings of the NARST 2006 Annual Meeting, National Association for Research in Science Teaching; C.Y.C. Hanke, *A cross-national study of students' perceptions of mathematics classroom environment, attitudes towards mathematics and academic self-efficacy among middle school students in Hong Kong and the USA* (Doctoral dissertation, Curtin University), 2013, Retrieved from https://espace.curtin.edu.au/bitstream/handle/20.500.11937/2575/199177_Hanke%22%2014.pdf?sequence=2; R. Zedan, J. Bitar, *Environment learning as a predictor of mathematics self-efficacy and math achievement*, American International Journal of Social Science, 2014, 3(6), p. 85-97.

de that school practices with supportive environment and encouraging relationships have increasing the mathematic self- efficacy, because it helps the students believing in their abilities when the schools environment give their students opportunities to appear and to participate in making decisions and in the way that they favor to learn.

Another effectiveness of school practices is on mathematic achievements. As we can see from the results that the students with a good perception on their school environment have a high mathematic achievements compared to students with a lower achievements. And that is agree with the conclusion that carried out by other researchers³³. We can explain this that students with a high perception about school practices feel more confident in their selves and so this will affect on their mathematical problem solving.

Finally, result from this study can be generalized to the population of all schools in Arab Sectors in Israel. Moreover, we can use the questionnaires that obtained from the study to identify the strength and weakness of schools in their teaching and learning process and focuses on improving their weakness and at the same time maintain the strength of their teaching strategies.

BIBLIOGRAPHY

- Abu bakar N., Usaini M., *The Influence of School Enviroment On Academic Performance of Secondary School Students in Kuala Terenddanu*, Malaysia International Conference on Empowering Islamic Civilization in 21th Century, University Sultan Zainal Abidin (UNiSZA), Malaysia 2015.
- Aid Suraya M.D., Wan Zah W.A.N., *Metacognition and Motivation in Mathematic Problem Solving*, The International Journal of Learning, 2009, (15).
- Ajzen L., Fishbein M., *Attitude-behavior relations: a theoretical analysis and review of empirical research*, Psychological Bulletin, 1977, (84).
- Alamolhodayi S.H., *Mathematics anxiety*, Journal of Psychology and Educational Sciences, 2000, 5(1).
- Anderson L., *From chaos to community*, 2004. Retrieved from <https://www.tolerance.org/classroom-resources/tolerance-lessons/from-chaos-to-community>.
- Ashcraft M.H., Ridely K.S., *Math anxiety and its cognitive consequences: a tutorial review*, [In:] *The Handbook of Mathematical Cognition*, Ed. J.I.D. Campbell, Psychology Press, New York 2005.
- Ayotolah A., Adedji T., *The relationship between mathematics self-efficacy and achievement in mathematics*, Procedural Social and Behavioral Sciences, 2009, (1).

³³ E.A. Hanushek, *The economics of schooling: Production and efficiency in public schools*, Journal of Economic Literature, 1986, 24, p. 1141-1177; R.M. Hauser, W.H. Sewell, S.F. Alwin, *High school effects on achievement*, [In:] *Schooling and achievement in American society*, Eds. W.H. Sewell, R.M. Hauser, D.L. Featherman, New York 1976, p. 309-341; J.D. Willms, *Social class segregation and its relationship to pupils examination results in Scotland*, American Sociological Review, 1986, 51, p. 224-241.

- Baloglu M., Kocak R., *A multivariate investigation of the differences in mathematics anxiety, Personality and Individual Differences*, 2006, (40).
- Bandura A., *Self-efficacy: Toward a unifying theory of behavioral change*, *Psychological Review*, 1977, 84(2).
- Brookover W., Beady C., Flood P., Schweitzer J., Wisenbaker J., *School social system and student achievement – school can make a difference*, Praeger, New York 1979.
- Coleman J.S., Hoffer T., Kilgore S., *Cognitive outcomes in public and private schools*, *Sociology of Education*, 1982, 55.
- Daemi M., Tahir A., Zafarghandi A.M., *The Relationship between Classroom Environment and EFL Learners Academic Self-Efficacy*, *International Journal of Education & Literacy Studies*, 2017, 5(4).
- Dorman J.P., *Associations between classroom environment and academic efficacy*, *Learning Environments Research*, 2001, 4(3).
- Dorman J., Adams J., *Associations between students' perceptions of classroom environment and academic efficacy in Australian and British secondary schools*, *Westminster Studies in Education*, 2004, 27(1).
- Dorman J., Waldrip B., Fisher D.L., *Classroom environment, students' perceptions of assessment, academic efficacy and attitude to science: A LISREL analysis*, In proceedings of the NARST 2006 Annual Meeting, National Association for Research in Science Teaching.
- Fennema E., *The Study of Affect and Mathematics: A Proposed Generic Model for Research*, [In:] *Affect and Mathematical Problem Solving*, Eds. D.B. Mcleod, V.M. Adams, Cambridge University Press, New York 1989.
- Freiberg H.J., *Measuring school climate: Let me count the ways*, *Educational Leadership*, 1998, 56(1).
- Goose M., Brown R., Maker K., *Delf-Efficacy in mathematics: Affective Cognition, Cognitive Domains of Functioning*, Proceeding of the 21th Annual Conference of Mathematics Education Research Group of Australia 2008.
- Hanke C.Y.C., *A cross-national study of students' perceptions of mathematics classroom environment, attitudes towards mathematics and academic self-efficacy among middle school students in Hong Kong and the USA* (Doctoral dissertation, Curtin University), 2013, Retrieved from https://espace.curtin.edu.au/bitstream/handle/20.500.11937/2575/199177_Hanke%22014.pdf?sequence=2
- Hanushek E.A., *The economics of schooling: Production and efficiency in public schools*, *Journal of Economic Literature*, 1986, 24.
- Hauser R.M., Sewell W.H., Alwin S.F., *High school effects on achievement*, [In:] *Schooling and achievement in American society*, Eds. W.H. Sewell, R.M. Hauser, D.L. Featherman, Academic Press, New York 1976.
- Helding K., *What is happening in school* (Doctoral dissertation, University of Curtin 2009).
- Husu M.K., Wang S.W., Chiu K.K., *Computer attitude statistics anxiety and self-efficacy on statistical software adoption behavior: an empirical study of online MSA Learners*, *Computer and Human Behavior*, 2009, (25).
- Johnson B., Stevens J.J., *Student achievement and elementary teachers' perceptions of school climate*, *Learning Environments Research*, 2006, 2.
- Lee V.E., Bryk A.S., *A multilevel model of the social distribution of high school achievement*, *Sociology of Education*, 1989, 62.
- Lee V.E., Bryk A.S., Smith J.B., *The organization of effective secondary schools*, *Review of Research in Education*, 1993, 19.
- Ma X., Xu J., *The causal ordering of mathematics anxiety and mathematics achievement: a longitudinal panel analysis*, *Journal of Adolescence*, 2004, 27.

- May D., *Mathematic Self-Efficacy and Anxiety Questionnaire* (Doctoral dissertation, University of Michigan, 2009).
- Mc Dill E.L., Rigsby L.C., *Structure and process in secondary schools: the academic impact of educational climates*, Johns Hopkins University Press, Baltimore 1973.
- Opdenakker M.C., Damme J.V., *Do school context, student composition and school leadership affect school practice and outcomes in secondary education?* *British Educational Research Journal*, 2007, 33(2).
- Pajares F., *Self-efficacy beliefs in academic settings*, *Review of Educational Research*, 1996, 66.
- Pajares F., *Overview of Social Cognitive Theory and Mathematical Problem Solving of Gifted Students*, *Contemporary Educational Psychology*, 2002, (20).
- Taat M., Rozrio G., *The Influence of Learning Environment and Academic Self-Efficacy Towards Mathematics Achievement in Masterskill Global College Malaysia*, *International Journal of Arts and Commerce*, 2015, 4(2).
- Tapia M., Marsh G.E., *An Instrument to Measure Mathematics Attitude*, *Academic Exchange Quarterly*, 2004, 8(2).
- Walsh K.A., *The relationship among mathematics anxiety beliefs about mathematic, mathematics self-efficacy, and mathematic performance*, *Nursing Education Research*, 2008, 29(4).
- Wigfield A., Meece J.L., *Math anxiety in elementary and secondary school student*, *Journal of Educational Psychology*, 1988, 80.
- Willms J.D., *Social class segregation and its relationship to pupils examination results in Scotland*, *American Sociological Review*, 1986, 51.
- Yuksel-Sahin F., *Mathematics anxiety among 4th and 5th grade Turkish elementary school students*, *International Electronic Journal of Mathematic Education*, 2008, 3(3).
- Zedan R., Bitar J., *Environment learning as a predictor of mathematics self-efficacy and math achievement*, *American International Journal of Social Science*, 2014, 3(6).