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The Effect of Realistic Mathematics Education Activities Applied in Secondary School 7th Grade Mathematics Education on the Development of Life Skills

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Abstract: The aim of this research is to investigate the effect of teaching the Circle and Circular Region subject in the secondary school 7th grade curriculum by applying Realistic Mathematics Education activities on the development of students' life skills. The sample of this study consists of 46 students studying in the 7th grade of a secondary school in the Aegean Region. In this experimental research, a quasi-experimental design with pretest-posttest control group was used. In the study, it is planned to teach the lessons according to the teaching method in the curriculum in the classroom that constitutes the experimental group, by applying the Realistic Mathematics Education activities on the subject of Circle and Circular Region. As a data collection tool, real life skills scale was applied to both groups as pre-test and post-test. The obtained data were analyzed with non-parametric test techniques. According to the findings obtained as a result of the analysis, it was determined that mathematics teaching with the Realistic Mathematics Education approach was more effective in the development of life skills than the traditional approach and mathematics teaching.

Keywords: Realistic Mathematics Education, Teaching Mathematics, Life Skills

Introduction

Today, with the globalization of the world, developments in science and technology affect all societies. It has become necessary for societies to raise individuals with the qualifications required by the conditions in order to adapt to the rapidly developing and changing world. This requirement has included the concept of 21st century skills into our lives. 21st century skills; different institutions such as Assessment and Teaching of 21st Century Skills (ATCS), Partnership for 21st Century Learning (P21), Organization for Economic Co-operation and Development (OECD), European Union (EU), International Society for Technology in Education (ISTE) classified in different ways. Common skills such as creative thinking, problem solving, communication and creative thinking included in the education system overlap with P21 skills. P21 skills, learning and renewal skills; life and career skills; information, media and technology skills are examined in three sub-dimensions.

Life skills are defined by WHO (The World Health Organization [WHO], 1997) as adaptive, positive behavioral abilities that enable individuals to meet their daily needs and overcome the difficulties they face. WHO has established ten basic skill sets that will form the basis of many cultures and should be found in every healthy individual. These skills are; decision making skills, problem solving skills, empathy skills, self-awareness skills, coping skills, communication skills, coping with stress skills, creative thinking skills and critical thinking skills. These life skills are again classified by WHO as five basic life skills: decision making and problem solving, creative and critical thinking, communication and interpersonal communication, self-awareness and empathy, and coping with stress and emotions. Gulhane (2014) states that these skills are the skills that individuals apply to cope with the problems they frequently encounter in their daily life and gain through teaching.

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Raising individuals suitable for the changing, developing and globalizing world order in the 21st century is undoubtedly possible by adapting the education system to this. Accordingly, in recent years, traditional methods in education have been abandoned and new approaches have begun to be adopted. These approaches adopt the realization of learning through experiences rather than direct acquisition of knowledge. New approaches have affected mathematics education as well as many educational disciplines. Now, memorizing the rules and formulas for mathematics education in the classrooms has been put aside, and activities that develop the individual's reasoning, problem solving, communication, cooperation, etc. skills and which are based on associating mathematics with real life have begun to be adopted. All these have taken place in the education system with the approach of Realistic Mathematics Education.

Realistic Mathematics Education (GME) is a mathematics teaching approach that was put forward by Hans Freudenthal, a mathematician and educator in the Netherlands, and developed by the Freudenthal Institute (Akyüz, 2010). According to the Realistic Mathematics Education (RME) approach, mathematics is expressed as a human activity (Freudenthal, 1977; cited by Van den Heuvel –Panhuizen). In this approach, with the presentation of mathematics to the student in relation to daily life, the student takes an active part in this process. According to Freudenthal, mathematics started with real life problems throughout history and he claimed that these real life problems took the form of mathematics and reached formal mathematics. He called this process “mathematization”. There are two aspects that make the mathematization process important. First, mathematics is not just the job of mathematicians; it is the job of every individual. The second aspect is the idea of rediscovery. In this approach, the student must reach the information himself throughout the process, and the last step he reaches should be formal mathematics (Altun, 2006; Treffers, 1987). Freudenthal divided the mathematization process into horizontal mathematization and vertical mathematization. Horizontal mathematization is the first step. In this step, there is a transition from an environmental problem situation to symbols. The student uses this process to solve a real-life problem and can convey the real-life problem as a known mathematical problem. Vertical mathematization is a step forward and reorganization within the mathematical system. In this process, there is access to formulas from symbols. The student can explain the relationships between symbols, improve models, use different models, and obtain a mathematical formula (Zulkardi, 2002).

Learning mathematics is important in terms of gaining basic concepts and skills, as well as the necessity of using it in real life. The importance of understanding mathematics and using it in appropriate situations in our daily lives is increasing rapidly (MEB, 2009). Realistic Mathematics Education activities draw attention in terms of gaining life skills in terms of accessing information based on real life situations. In this context, it is thought that the implementation of Realistic Mathematics Education activities in mathematics teaching is important for the individual to gain life skills.

Innovations provided by the development of science and technology have accelerated the globalization of our world. Globalization affects countries in every field. One of these areas is education. Our living conditions, which are in constant development and change, require the education system to be shaped accordingly. It is seen that the students who grow up with the education system in which traditional methods are used are lacking in terms of life skills in preparing for life. The age we live in requires a system in which the student takes an active role in the education system and accesses information through their own experiences. However, an individual who grows up in this system is expected to be prepared for society by gaining life skills. Individuals who are brought to the society by gaining life skills in the education system constitute the future of that society. Today, individuals who lead the development of science and technology have an important place in determining the future of both their societies and the world.

Ensuring developments in the fields of science and technology is directly related to mathematics, which is one of the basic disciplines of education. Therefore, the importance of teaching mathematics has increased for societies that want to advance in these areas. Koçak (2011), states that social developments depend on mathematical knowledge. Altın and Memnun (2008) state that with the increasing importance given to mathematics in Turkey and many countries in recent years, some reforms have been made in education systems and the individual has to solve a problem by producing his own solution. This situation shows that Realistic Mathematics Education, which is put forward with the view that mathematics is a human life activity, has an important place in mathematics teaching in many countries.

Our country's success level is low in the results of internationally applied exams such as TIMSS and PISA, in which knowledge and skills are measured based on real-life situations. These results show that we do not give enough place to teaching on the basis of real life problems in our education system. Realistic Mathematics

Education takes its place as an approach that we need to focus on in our education system in terms of providing the individual to reach information by solving real life problems by the individual.

In today's world, where information and technology are developing rapidly, the ability of societies to adapt to the age depends on raising their individuals with education suitable for development. Information and technology are developing intertwined with mathematics. Providing mathematics education to individuals in accordance with the requirements of the age provides convenience in the adaptation of societies to the global order in the age of rapidly changing information and technology. Alsina (2002), states that in today's globalizing world, mathematics teaching should also be looked at from a global perspective and that mathematics teaching in schools should be associated with problems from daily life more.

With the renewal of our education system, one of the primary goals has been to solve the problems that the individual may encounter throughout his life on his own. Therefore, the individual needs to understand the problem himself, to collect data for the solution, to develop different solutions and to interpret the appropriateness of the results he finds correctly (MEB, 2016a). Providing mathematics teaching by associating it with real life is important in terms of providing a more meaningful learning for the student. In addition to learning, it is also important for the individual to gain life skills. Realistic Mathematics Education activities are one of the most preferred methods for concretizing mathematics teaching with real life situations. During the implementation of Realistic Mathematics Education activities, it is expected that the student's active participation in the process of solving the problems associated with his daily life will positively affect the student's life skills.

Teaching environments in which students are actively involved contribute to the life skills of individuals. According to studies conducted in the USA and England, it is seen that methods used other than traditional teaching are effective in the development of life skills (İşmen et al., 2015). Realistic Mathematics Education is a teaching method that actively involves students in the process and deals with real-life situations. Therefore, our study is important in terms of seeing the effectiveness of this teaching method on real life skills.

When the international literature on Realistic Mathematics Education is examined, it is seen that realistic mathematics education aims to improve students' mathematical communication (Trisnawati et al., 2018) skills (Hirza et al., 2014) and mathematical literacy (Sumirattana et al., 2017) and critical thinking skills (Cahyaningsih & Nahdi, 2021) are noteworthy. Considering the national literature on Realistic Mathematics Education, fractions, symmetry, equations, inequalities, logic, multiplication and division in integers, ratio-proportionality, surface dimensions, It is seen that there are studies investigating the effects of student success in many fields such as probability and statistics, integral, angle, coordinate system and line equation, measuring fluids and lengths, measuring time (Akkaya, 2010; Akyüz, 2010; Altaylı, 2012; Bildircin, 2012; Bintaş et al., 2003; Can, 2012; Çakır, 2011; Çakır, 2013; Demirdöğen, 2007; Gelibolu, 2008; Özdemir, 2008; Sezgin-Memnun, 2011; Tunalı, 2010; Ünal, 2008; Üzel, 2007). No study has been found regarding the use of Realistic Mathematics education activities in the teaching of Circle and Circular Region. In addition, a study examining the effect of Realistic Mathematics Education in terms of life skills variable could not be reached. Therefore, it was deemed necessary to conduct this research in order to eliminate the deficiency of the study on this subject and the field it affects in the literature.

When the literature is examined, since there are no studies in which the Realistic Mathematics Education activities used in mathematics teaching are applied in the teaching of Circle and Circular Region and in terms of the areas affected by Realistic Mathematics Education, the effects on student success, mathematics anxiety, mathematics self-efficacy perception, visual mathematics literacy, problem solving attitudes, strategy use, permanence of learning studies have been carried out in terms of its effect on reflective thinking skills and student motivation. However, there is no study yet on its effect on life skills. This study is also important in terms of contributing to the literature.

Yenilmez and Demirhan (2013) state that students have some difficulties in learning about the Circle and Circular Region subject in the 7th grade curriculum. Evirgen and İkikardeş (2009), in their study to determine the subjects that seventh grade students have difficulty in mathematics lesson, "angles in circle or circular region", "the length of the circle and circle segment", "circular region and the areas of the circle slice" are among the subjects that students have difficulty in learning is located. Bray and Tangnay (2015) concluded in their study that the Realistic Mathematics Education approach increased students' motivation and was effective in learning. Similarly, Laurens et al., (2017) found that the Realistic Mathematics Education approach was effective in students' cognitive achievement. This shows the necessity of Realistic Mathematics Education activities in the teaching of this subject, since students have difficulties in learning the subject of Circle and

Circular Region. It is thought that realistic mathematics education activities will have an impact on the development of students' life skills, since they are applied based on real life problems during the application phase. Therefore, in this study, it is aimed to examine the effect of realistic mathematics education activities applied in secondary school 7th grade mathematics teaching on the development of life skills. In line with this general purpose, answers to the following questions were sought.

1. Is there a statistically significant difference between the pre-test and post-test scores of the students in the experimental group (EG) in terms of the development of life skills?
2. Is there a statistically significant difference between the pre-test and post-test scores of the students in the control group (CG) in terms of developing life skills?
3. Is there a statistically significant difference between the pre-test and post-test scores of the students in EG and CG in terms of developing life skills?

Method

Research Model

A quasi-experimental design with pre-test and post-test control groups was used in this study, in which the effect of mathematics teaching with Realistic Mathematics Education on the real-life skills of 7th grade students was investigated. Cohen et al., (2007), state that the quasi-experimental method is preferred in experimental studies when it is not possible to randomly assign subjects to the experimental and control groups. Generally, quasi-experimental method is preferred in educational research (Karataş, 2008). In educational research, it is not possible to assign randomly, since classes are predetermined by school administrators. However, one of the predetermined classes can be randomly assigned as the experimental group and the other as the control group (Özmen, 2015). In our study, the groups were determined by random assignment on a class basis and mathematics teaching was carried out in accordance with the Realistic Mathematics Education in the experimental group and in the control group in accordance with the traditional method. Measurements were made by applying the life skills scale before and after the application.

Table 1. Experimental design of the research

Groups	Pretest	Method applied	Posttest
Experimental group	Life skills scale	Realistic mathematic education	Life skills scale
Control group	Life skills scale	Traditional method	Life skills scale

Research Group

The sample of the study consists of 46 students studying in the 7th grade of a secondary school in the Aegean Region in the second term of the academic year 2021/2022. In the experimental group, 23 students, 11 female students and 12 male students; in the control group, there are 23 students, including 6 female students and 17 male students. The sample for the research was determined according to the easily accessible sampling method, which is one of the purposive sampling methods. The reason for using this method is that it is the school where the researcher works, the sample is easily accessible and the participants who make up the sample participate voluntarily.

Data Collection Tools

In this study, the Life Skills Scale developed by Bolat and Balaman (2017) was used. The scale consists of 5 sub-dimensions and 30 items. These sub-dimensions are "Decision Making and Problem Solving", "Creative Thinking and Critical Thinking", "Communication Interpersonal Relationship", "Empathy and Self-Awareness", "Coping with Emotions and Stress". The sub-dimensions of "Coping with Emotions and Stress", "Empathy and Self-Awareness Skills", "Decision Making and Problem Solving Skills" consist of 7 items; "Creative Thinking and Critical Thinking" sub-dimension consists of 5 items; The "Communication Interpersonal Skills" sub-dimension consists of 4 items. When the Cronbach Alpha reliability coefficients of the items in the five sub-dimensions are examined for each sub-dimension, the reliability coefficient of the items belonging to the "Coping with Emotions and Stress" sub-dimension is 0.82; The reliability coefficient of the items belonging to the "Empathy and Self-Awareness Skills" sub-dimension was 0.77; The reliability coefficient of the items belonging to the "Decision Making and Problem Solving Skills" sub-dimension was 0.72; The reliability

coefficient of the items belonging to the "Creative Thinking and Critical Thinking Skills" sub-dimension was 0.73; It was observed that the reliability coefficient of the items belonging to the "Communication Interpersonal Relationship Skills" sub-dimension was calculated as 0.66. The Cronbach Alpha reliability coefficient value of the Life Skills Scale, which consists of 30 items, was calculated as 0.90. In this study, the Cronbach Alpha reliability coefficient value obtained from the Life Skills Scale consisting of 30 items was calculated as 0.87. According to Tavşancıl (2006), for a scale to be considered reliable, the coefficient is expected to be above 0.70. According to the obtained values, it is understood that the whole scale and its sub-factors are reliable. In this scale, students' level of agreement with the items is as follows: "strongly disagree", "disagree", "undecided", "agree", "strongly agree". The answers given by the students to the scale items were scored with a 1-5 rating scale.

Application Process

Our research was carried out with two branches consisting of 46 students, who constitute the 7th grade of a secondary school in the Aegean Region, in accordance with its purpose. Branches were randomly determined as experimental and control groups. Before the application, the life skills scale was applied as a pre-test to the students in the experimental and control groups. Before the application, the experimental group was informed about Realistic Mathematics Education. In the teaching of the Circle and Circular Region, the lessons will be taught in accordance with this approach and the stages of the lesson process in accordance with the approach were explained to the students. In the experimental group, activities suitable for the acquisition of the subject were carried out, taking into account the readiness of the students during the application. The activities were created by the researcher using sample questions suitable for Realistic Mathematics Education. The questions used in the activities were directed to the experimental group students in relation to daily life. The Circle and Circular Region topic is included in the current curriculum, covering 10 lesson hours. In accordance with the achievements in the curriculum, the application process was completed with the experimental group students with eight-hour in-class activities and two-hour out-of-class activities. A total of eight activities were applied to the students in the experimental group. An activity was applied in the classroom in order to distinguish the circle and the circular region for the subject of Circle and Circular Region by the students. An activity aimed at the acquisition of "Center angles in a circle determine the relationships between arcs and angle measures" of the Circle and Circular Region topic was applied in the classroom. Two activities were applied in class in accordance with the outcome of "Calculates the length of the circle and the circle segment". Three activities were applied in the classroom in accordance with the outcome of "Calculates the area of the circle and circle slice". An activity outside the classroom was used to calculate the circle length and the area of the circle by the students. While creating the activities, visuals that students can connect with real life were used. In accordance with the activities implemented in the classroom, the students participated individually or in groups. During the activities, students were given a certain amount of time to think. In the activities carried out in groups, it was ensured that the students communicate with each other and work in cooperation. It was paid attention that the questions included in the activities were created from situations that students may encounter in daily life in accordance with the principles of the Realistic Mathematics Education approach. Lessons were taught with the control group students according to the method and process in the current curriculum. After the application, the life skills scale was applied to the students in both groups. Evaluation was made according to the pretest and posttest scores obtained from the applied scales.

Data Analysis

SPSS package program was used in the analysis of the quantitative data obtained in the research. The Life Skills Scale is a 5-point Likert type scale. While obtaining the results of the analysis, 1 point was given to the "strongly disagree" option, 2 points to the "disagree" option, 3 points to the "undecided" option, 4 points to the "agree strongly" option, and 5 points to the "strongly disagree" option. In our study, there were 23 students in the experimental group and 23 students in the control group. Shapiro Wilk normality analysis was applied to determine whether the obtained data showed normal distribution. Considering the sample size for the assumption of normality, if the sample size is less than 50, it is appropriate to use the Shapiro Wilk test (Büyükoztürk, 2013).

Table.2 Normality test results of pretest and posttest scores of the experimental and control groups

Groups	Shapiro-Wilk	df	p
Experimental group			
Pretest	.958	23	.424

Posttest	.957	23	.407
Control group			
Pretest	.971	23	.705
Posttest	.939	23	.167

When Table 2 is examined, the Shapiro-Wilk test scores of the data obtained from the participants in the experimental and control groups show a normal distribution. While analyzing the data, Wilcoxon Signed Rank Test and Mann Whitney U test, which are non-parametric test techniques, were used instead of the dependent groups t test and independent groups t test, which are parametric test techniques in the SPSS statistical package program, since the study groups were less than 30 and the population with normal distribution could not be represented.

Results and Discussion

Findings

In this part of the research, the findings obtained as a result of the statistical analysis of the data collected by the methods used in accordance with the purpose of the research and the comments on these findings are included. In the first subproblem of the study, “Is there a statistically significant difference between the pretest and posttest scores of the students in the experimental group (EG) in terms of the development of life skills?” is in the form. Accordingly, it was aimed to determine whether there is a statistically significant difference between the pretest and posttest scores of the experimental group, in which the Realistic Mathematics Education approach was used in the 7th grade mathematics teaching, in the development of life skills.

As seen in Table 2, the pretest and posttest scores of the experimental group were tested to be normally distributed by applying the Shapiro Wilk test. However, nonparametric statistical tests were used because the study group was less than 30 and could not represent the population. The pretest and posttest scores of the experimental group's Life Skills Scale were analyzed by applying the Wilcoxon Signed Rank Test in the statistical package program. Table 3 shows the Wilcoxon Signed Rank Test analysis results of the scores according to the Life Skills Scale of the experimental group.

Table 3. Comparison of pre-test-post-test scores of the experimental group with Wilcoxon test

	N	Rank mean	Sum of ranks	z	P
Negative rank	7	9.36	65.50	-1.983	0.047
Positive rank	15	12.5	187.50		
Equal	1				

Note: The result is based on negative ranks. * $p < 0.05$

When the Wilcoxon Signed Rank Test analysis given in Table 3 was examined, it was determined that there was a statistically significant difference between the pretest and posttest scores of the experimental group students from the Life Skills Scale ($z = -1.983$; $p < 0.05$). It is seen that this difference is in favor of posttest scores. According to the findings obtained as a result of the analysis, it can be said that mathematics teaching with the Realistic Mathematics Education approach is effective in developing life skills.

The second subproblem of the study was “Is there a statistically significant difference between the pretest and posttest scores of the students in the control group (CG) in terms of the development of life skills?” is in the form. In the control group, mathematics teaching was carried out with the traditional method. It is aimed to determine whether there is a statistically significant difference between the pretest and posttest scores applied before and after the determined subject.

As seen in Table 2, the pretest and posttest scores of the control group obtained by applying the Shapiro Wilk normality test show normal distribution. However, in the analysis of the data, since the number of control group was less than 30, it could not fully represent the population with normal distribution, instead of parametric tests, the test techniques corresponding to nonparametric tests were used. In accordance with our second sub-purpose, the pretest and posttest scores of the Life Skills Scale were analyzed by applying the Wilcoxon Signed Rank Test, one of the statistical analysis techniques, in the statistical package program. The analysis results of the pretest and posttest scores of the control group are given in Table 4.

Table 4. Comparison of the pretest-posttest scores of the control group with the Wilcoxon test

	N	Rank mean	Sum of ranks	z	P
Negative rank	10	12.30	123.00	-0.457	0.648
Positive rank	13	11.77	153.00		
Equal	0				

Note: The result is based on negative ranks. * $p < 0.05$

When the Wilcoxon Signed Rank Test analysis given in Table 4 was examined, it was determined that there was no statistically significant difference between the pretest and posttest scores of the control group students from the Life Skills Scale ($z = -0.457$; $p > 0.05$). As a result of the analysis, it can be said that the traditional method of mathematics teaching is not effective in the development of life skills.

The third subproblem of the study was “Is there a statistically significant difference between the pre-test and post-test scores of the students in the experimental group and the control group in terms of the development of life skills?” is in the form. It is aimed to determine whether there is a statistically significant difference between the Life Skills Scale pre-test scores obtained before the application and the post-test scores obtained after the application of the experimental group, in which mathematics teaching is provided by applying activities suitable for the Realistic Mathematics Education approach, and the control group, which is taught mathematics with the traditional approach.

As can be seen in Table 2, the pretest and posttest scores of the experimental and control groups show normal distribution by applying the Shapiro Wilk normality test. However, in the analysis process of the data, since the number of data belonging to the experimental and control groups was less than 30 and could not fully represent the normally distributed universe, nonparametric tests were used instead of parametric tests. In accordance with our third subproblem, the experimental group pretest scores obtained by applying the Life Skills Scale and the control group pretest scores, and the experimental group and control group post-test scores were analyzed by applying the Mann Whitney U test, one of the statistical analysis techniques. The analysis results obtained by applying the Mann Whitney U test are given in Table 5.

Table 5. Findings regarding the pretest-posttest scores of the experimental and control groups

	Groups	N	Rank mean	Sum of ranks	U	P
Pretest	Experimental	23	25.89	595.50	209.500	0.226
	Control	23	21.11	485.50		
Posttest	Experimental	23	28.28	650.50	154.500	0.016
	Control	23	18.72	430.30		

* $p < 0.05$

As can be seen in Table 5, the mean rank in the pre-test in the experimental group that was taught mathematics with Realistic Mathematics Education was 25.89; the mean rank was found to be 21.11 in the control group, which was taught mathematics with the traditional method. Accordingly, it was determined that the difference between the pre-test scores of the experimental and control groups was not statistically significant ($U = 209.500$, $p = 0.226 > 0.05$).

As a result of the posttest applied to the experimental group, who was taught mathematics with Realistic Mathematics Education, the average rank was 28.28; As a result of the posttest performed in the control group, which was taught mathematics with the traditional method, the mean rank was found to be 18.72. Accordingly, it was determined that the difference between the posttest scores of the experimental and control groups was statistically significant ($U = 154.500$; $p = 0.016 < 0.05$).

In accordance with the results obtained in the research, the use of Realistic Mathematics Education approach in the teaching of the 7th grade "Circle and Circular Region" topic was more effective in the development of life skills compared to the traditional method. As a result, it can be said that mathematics teaching provided with the Realistic Mathematics Education approach is more effective than the traditional method of mathematics teaching in the development of life skills.

Conclusion

Pretest and posttest were applied to the experimental and control groups in order to measure the effect of Realistic Mathematics education and mathematics teaching on the real-life skills development of students. As a result of the statistical analysis of the pretest scores of the experimental and control groups before the application, it was determined that there was no significant difference between the two groups. However, it was determined that the statistical analysis results for the posttest scores applied to the experimental and control groups after the application showed a significant difference in favor of the experimental group. The posttest analysis results applied to both groups showed that the Realistic Mathematics Education approach was more effective. This result, in the study conducted by Cansız (2015) in which the effect of Realistic Mathematics Education approach on students' success and creative thinking skills was examined, it was seen that the Realistic Mathematics Education approach positively affected students' creative thinking skills. This result supports the results of the research. In the study conducted by Cahyaningsih and Nahdi (2021), in which the effects of Realistic Mathematics Education on students' critical thinking skills were examined, it was found that Realistic Mathematics Education positively affected students' critical thinking skills. This finding is similar to the results of the research conducted.

When the differences between the posttest and pretest scores of the experimental and control groups were compared, it was determined that there was a significant difference in favor of the experimental group. According to this result, it has been shown that the Realistic Mathematics Education approach is effective in the development of life skills. This situation is similar to the result of Realistic Mathematics Education made by Üzel (2007), that realistic mathematics education and mathematics teaching have an effect on student success. Similarly, the study conducted by Çilingir and Artut (2016), which concluded that realistic mathematics education positively affects student achievement, visual mathematics literacy, self-efficacy perceptions and problem solving skills, supports this study. At the same time, the results of this study are similar to the results of the study conducted by Zakaria and Syamaun (2017) on the positive effects of realistic mathematics education on student achievement and mathematics attitude.

Recommendations

This research, which examines the effect of Realistic Mathematics Education on the development of life skills, was carried out with a study group consisting of 46 people. Accordingly, it is recommended to apply on larger groups for future studies. The research was limited to the application of "Circle and Circular Region" in 10 lesson hours. Different studies can be done within the scope of more subjects and in a longer time period. With the use of Realistic Mathematics Education approach in teaching the subject of Circle and Circular Region, academic success, permanence, attitude, motivation, visual studies can be carried out to ensure that its effect is seen in terms of variables such as literacy. Realistic Mathematics Education is an approach that requires preliminary preparation for teachers. The lack of sufficient activities seems to be not common for teachers. Therefore, in service training can be given to encourage teachers to apply this approach. Different subjects and Activity studies for Realistic Mathematics education for learning groups can be diversified and increased.

Scientific Ethics Declaration

The authors declare that the scientific ethical and legal responsibility of this article published in EPESS journal belongs to the authors.

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References

Akkaya, R. (2010). *Olasılık ve istatistik öğrenme alanındaki kavramların gerçekçi matematik eğitimi ve yapılandırmacılık kuramına göre bilgi oluşturma sürecinin incelemesi*. Yayınlanmamış doktora tezi, Uludağ Üniversitesi, Bursa.

- Akyüz, M. C. (2010). *Gerçekçi matematik eğitimi (RME) yönteminin ortaöğretim 12. sınıf matematik (integral ünitesi) öğretiminde öğrenci başarısına etkisi*. Yayınlanmamış yüksek lisans tezi, Yüzüncü Yıl Üniversitesi, Van.
- Alsina, C. (2002). Too much is not enough: Teaching maths through useful applications with local and global perspectives. *Educational Studies in Mathematics*, 59(2), 239-250.
- Altaylı, D. (2012). *Gerçekçi matematik eğitiminin oran ve orantı konusu öğretimi ve orantısal akıl yürütme becerilerinin geliştirilmesine etkisi*. Yayınlanmamış yüksek lisans tezi, Atatürk Üniversitesi, Erzurum.
- Altun, M. (2006). Matematik öğretiminde gelişmeler. *Uludağ Üniversitesi Eğitim Fakültesi Dergisi*, 19 (2), 223-238.
- Altun, M. & Memnun, D. S. (2008). Matematik öğretmeni adaylarının rutin olmayan matematiksel problemleri çözme becerileri ve bu konudaki düşünceleri. *Eğitimde Kuram ve Uygulama*, 4(2), 213-237.
- Bolat, Y., & Balaman, F. (2017). Yaşam becerileri ölçeği: Geçerlik ve güvenilirlik çalışması [Life skills scale: Validity and reliability study]. *İnsan ve Toplum Bilimleri Araştırmaları Dergisi*, 6(4), 22-39.
- Bıldırın, V. (2012). *Gerçekçi matematik eğitimi yaklaşımının (GME) ilköğretim beşinci sınıflarda uzunluk, hacim ve alan kavramlarının öğretimine etkisi*. Yayınlanmamış yüksek lisans tezi, Ahi Evran Üniversitesi, Kırşehir.
- Bintaş, J., Altun, M., & Arslan, K., (2003). *GME ile simetri öğretimi*. http://www.matder.org.tr/index.php?option=com_content&view=article&id=57:simetriogretimi&catid=8:matematik-kosesi-makaleleri&Itemid=172
- Bray, A., & Tangney, B. (2016). Enhancing student engagement through the affordances of mobile technology: A 21st century learning perspective on Realistic Mathematics Education. *Mathematics Education Research Journal*, 28(1), 173-197.
- Büyüköztürk, Ş. (2013). *Sosyal bilimler için veri analizi el kitabı* (18. Baskı). Ankara: PegemA Yayınları
- Cahyaningsih, U., & Nahdi, D. S. (2021, February). The effect of realistic mathematics education on elementary students' critical thinking skills. *Journal of Physics: Conference Series* (Vol. 1764, No. 1, p. 012127). IOP Publishing.
- Can, M. (2012). *İlköğretim 3. sınıfta ölçme konusunda gerçekçi matematik eğitimi yaklaşımının öğrenci başarısına ve kalıcılığa etkisi*. Yayınlanmamış yüksek lisans tezi, Abant İzzet Baysal Üniversitesi, Bolu.
- Cansız, Ş. (2015). *Gerçekçi matematik eğitimi yaklaşımının öğrencilerin matematik başarısına ve yaratıcı düşünme becerilerine etkisi*. Yayınlanmamış doktora tezi, Atatürk Üniversitesi Eğitim Bilimleri Enstitüsü, Erzurum.
- Cohen, L., Manion, L., & Morrison, K. (2007). *Research methods in education* (6th ed.). Abingdon: Routledge.
- Çakır, P. (2013). *Gerçekçi matematik eğitimi yaklaşımının ilköğretim 4. sınıf öğrencilerinin erişilerine ve motivasyonlarına etkisi*. Yayınlanmamış yüksek lisans tezi, Dokuz Eylül Üniversitesi, İzmir.
- Çakır, Z. (2011). *Gerçekçi matematik eğitimi yönteminin ilköğretim 6.sınıf düzeyinde cebir ve alan konularında öğrenci başarısına ve tutumuna etkisi*. Yayınlanmamış yüksek lisans tezi, Zonguldak Karaelmas Üniversitesi, Zonguldak.
- Çilingir, E., & Artut, P. D. (2016). Gerçekçi matematik eğitimi yaklaşımının ilköğretim öğrencilerinin başarılarına, görsel matematik okuryazarlığı özyeterlik algılarına ve problem çözme tutumlarına etkisi. *Turkish Journal of Computer and Mathematics Education*, 7(3), 578-600.
- Demirdöğen, N. (2007). *Gerçekçi matematik öğretimi yönteminin ilköğretim 6.sınıflarda kesir kavramının öğretimine etkisi*. Yayınlanmamış yüksek lisans tezi, Gazi Üniversitesi, Ankara.
- Evirgen, O., & İkikardeş, N. Y. (2019). 7. sınıf matematik dersinde zorlanılan konulara ilişkin öğrenci görüşlerinin incelenmesi. *Bahkesir Üniversitesi Fen Bilimleri Enstitüsü Dergisi*, 21(1), 416-435.
- Freudenthal, H. (1973). *Mathematics as an educational task*. Dordrecht: Reidel.
- Gelibolu, M. F. (2008). *Gerçekçi matematik eğitimiyle geliştirilen bilgisayar destekli mantık öğretimi materyallerinin 9.sınıf matematik dersinde uygulanmasının değerlendirilmesi*. Yayınlanmamış yüksek lisans tezi, Ege Üniversitesi, İzmir.
- Gulhane, T. F (2014). Life skills development through school education. *IOSR Journal of Sports and Physical Education (IOSR-JSPE)*, 1(6), 28-29.
- Hirza, B., & Kusumah, Y. S. (2014). Improving intuition skills with realistic mathematics education. *Indonesian Mathematical Society Journal on Mathematics Education*, 5(1), 27-34.
- İşmen Gazioğlu, A. E. & Canel, A. N. (2015). Bağımlılıkla mücadelede okul temelli bir önleme modeli: Yaşam becerileri eğitimi. *ADDICTA: The Turkish Journal on Addictions*, 2(2), 5-44.
- Karataş, İ. (2008). *Problem çözmeye dayalı öğrenme ortamının bilişsel ve duyuşsal öğrenmeye etkisi*. Doktora Tezi, Karadeniz Teknik Üniversitesi, Trabzon.
- Koçak, Ş. (2011). *50 soruda matematik* (1. Baskı). İstanbul: 7 Renk (Bilim ve Gelecek Kitaplığı) Yayınları

- Laurens, T., Batlolona, F. A., Batlolona, J. R., & Leasa, M. (2017). How does realistic mathematics education (RME) improve students' mathematics cognitive achievement?. *Eurasia Journal of Mathematics, Science and Technology Education*, 14(2), 569-578.
- MEB (2009). *İlköğretim matematik dersi 6-8. sınıflar öğretim programı ve kılavuzu*, Ankara.
- MEB (2016a). *Uluslararası öğrenci değerlendirme programı*. <http://pisa.meb.gov.tr>
- Özdemir, E. (2008). *Gerçekçi matematik eğitimine dayalı olarak yapılan yüzey ölçüleri ve hacimler ünitesinin öğretiminin öğrenci başarısına etkisi ve öğretime yönelik öğrenci görüşleri*. Yayınlanmamış yüksek lisans tezi, Balıkesir Üniversitesi, Balıkesir.
- Özmen, H. (2015). Deneysel araştırma yöntemi. M. Metin (Ed.). *Eğitimde bilimsel araştırma yöntemleri* (ss. 47-76). Ankara: Pegem Akademi.
- Sezgin-Memnun, D. (2011). *İlköğretim altıncı sınıf öğrencilerinin analitik geometrinin koordinat sistemi ve doğru denklemi kavramlarını oluşturmaları süreçlerinin araştırılması*. Yayınlanmamış doktora tezi, Uludağ Üniversitesi, Bursa.
- Sumirattana, S., Makanong, A., & Thipkong, S. (2017). Using realistic mathematics education and the DAPIC problem-solving process to enhance secondary school students' mathematical literacy. *Kasetsart Journal of Social Sciences*, 38(3), 307-315.
- Tavşancıl, E. (2006). *Tutumların ölçülmesi ve SPSS ile veri analizi*. Ankara: Nobel Yayıncılık.
- The World Health Organization [WHO]. (1997). *Life skills education in schools. Programme on mental health. division of mental health and prevention of substance abuse*. World Health Organization.
- Treffers, A. (1987). *Three dimensions. A model of goal and theory description in mathematics education*. Netherlands, Dordrecht: Kluwer Academic Publishers.
- Trisnawati, Pratiwi, R., & Waziana, W. (2018). The effect of realistic mathematics education on student's mathematical communication ability. *Malikussaleh Journal of Mathematics Learning*, 1(1), 31-35. <https://doi.org/10.29103/mjml.v1i1.741>
- Tunalı, Ö. (2010). *Açı kavramının gerçekçi matematik öğretimi ve yapılandırmacı kurama göre öğretiminin karşılaştırılması*. Yayınlanmamış yüksek lisans tezi, Uludağ Üniversitesi, Bursa.
- Ünal, Z. A. (2008). *Gerçekçi matematik eğitiminin ilköğretim 7.sınıf öğrencilerinin başarılarına ve matematiğe karşı tutumlarına etkisi*. Yayınlanmamış yüksek lisans tezi, Atatürk Üniversitesi, Erzurum.
- Üzel, D. (2007). *Gerçekçi matematik eğitimi (RME) destekli eğitimin ilköğretim 7. sınıf matematik öğretiminde öğrenci başarısına etkisi*. Yayınlanmamış doktora tezi, Balıkesir Üniversitesi, Balıkesir.
- Van den Heuvel-Panhuizen, M. (2000). Mathematics education in the Netherlands: A guided tour. *Freudenthal Institute Cd-rom for ICME9*. Utrecht: Utrecht University
- Yenilmez, K., & Demirhan, H. (2013). Altıncı sınıf öğrencilerinin bazı temel matematik kavramları anlama düzeyleri. *Dicle Üniversitesi Ziya Gökalp Eğitim Fakültesi Dergisi*, 20, 275-292.
- Zakaria, E., & Syamaun, M. (2017). The effect of realistic mathematics education approach on students' achievement and attitudes towards mathematics. *Mathematics Education Trends and Research*, 1(1), 32-40.
- Zulkardi, Z. (2002). *How to design mathematics lessons based on the realistic approach?* <https://repository.unsri.ac.id/6362/1/rme.html#anchor64854>

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