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Risk Factors of the COVID-19 Pandemic in the Development of Preschool Children and Protective Factors

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ABSTRACT

The coronavirus epidemic that erupted in Wuhan, China, in 2019, spread rapidly and affected the entire world. The fight against the epidemic has brought about many changes in people's lives and relationships, including preschool children, who are affected by the epidemic process. Preschool is a phase in which development is rapid and environmental factors have a high impact on development that encompasses many critical development phases. In this rapid development phase, the impact of the Covid-19 pandemic process on children is revealed by the ongoing daily scientific studies, which discussed protective factors and risk factors with regard to the development of preschoolers during the pandemic process, and was conducted in the form of a compilation within the framework of data collected from the literature. The study assessed the risk factors of preschool children as risk factors for physical motor development, risk factors for social development, risk factors for emotional development, and risk factors for cognitive language development. Factors that can play a protective role in this are defined jointly for all areas of development.

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INTRODUCTION

It emerged in 2019 in Wuhan city of China, in March 2020 the first cases seen in Turkey coronavirus outbreak was under the influence spread all over the world in a short time. The epidemic, which was quickly declared a pandemic by the World Health Organization (WHO), has brought about many changes in human life, health, living conditions, the economy, psychology, and human relations (Romero, Lopez-Romero, Dominguez-Alvarez, Villar & Gomez-Fraguela, 2020), affecting people of all ages and professions in different ways. During the epidemic, preschool-age children are among the individuals most affected by the stage of development in which they find themselves. Pre-school is a stage in which development is rapid, involves many critical stages of development, and the impact of environmental factors on development is high. In periods of rapid development, changes in the child's life can be a risk factor that can negatively affect the development (Ghosh, Dubey, Chatterjee & Dubey, 2020). However, the positive behaviors, appropriate practices, and preventive interventions that adults around the child engage in this process can also become a protective factor that reduces or eliminates the effects of the pandemic (Racine et al. 2020). In this study, the risk factors that may occur in the development of preschool children due to the covid 19 pandemic and the factors that may play a protective role were investigated on the basis of the literature. Risk factors are presented as risk factors for physical and motor development, risk factors for social development, risk factors for emotional development, and risk factors for cognitive and linguistic development. Physical development and motor development, cognitive development, and language development are presented together because they are areas of development that interact very intensively with each other and the risk factors presented affect these areas in a similar way.

Risk factors of physical and motor development

Physical and motor development in early childhood is closely related to an individual's health status. Risk factors for physical and motor development are diseases such as sleep disturbances, mistakes in the use of masks, the risk of inactivity and obesity, unhealthy eating, reduced opportunities to play outdoors, which can pose a risk to the individual's health due to the Covid 19 pandemic.

Sleep disorders: Sleep is just as important and indispensable in human life as breathing, eating, and excretion and is the basic condition for health. Sleep is also a very important habit for the growth and development of the child (Murthy, Bharti, Malhi & Khadwal, 2015). Sleep habits are among the habits that families struggle with while having children (Lavigne et al. 1999). Practices such as interrupting education in some countries during the pandemic process and changing parents' working patterns and working hours, some of which are converted to flexible working models, some working from home, can change the sleeping habits of children in some families. Families tend to violate the rules they set during their sleeping and waking hours, which can lead to a deterioration in sleeping habits and make sleeping habits an important risk factor for the physical development, motor development and health of the child.

Mistakes in the use of masks: The use of masks is one of the key measures for the prevention of coronavirus infections (Bicen & Erturk, 2020). However, if some questions regarding the use of masks are not taken into account, the use of masks due to misuse can also become an important risk factor that endangers development and health found that the use of masks over a long period of time in activities that require intensive exercise is risky for health (Epstein et al. 2020). Pre-school is a time when children's need for movement is intense. During the pandemic process, children go to the fresh air for limited hours and can play games with intense movement during these hours. Performing activities that require intensive movement in masks over a long period of time may be an important risk factor, especially for people with heart disease (Yalcin, 2020). Another situation that can make the use of masks a risk factor is the risk of infection that masks carry when worn for long hours. There is information in the literature that long-term and repeated use of masks may pose a risk for the individual to infect himself and others (WHO, 2020; Yalcin, 2020). There are suggestions for changing the mask, especially when it is moist (WHO, 2020). Using masks over long

periods of time without taking these recommendations into account can lead to health risks, particularly from infections. Apart from the fact that if children do not wear the mask correctly, touch the outside of the mask and change the mask between them, the mask whose main purpose is protection can become a risk factor.

Exercise deficiency and obesity: One of the most important factors for the physical and motor development of the child is the freedom of movement (Akyol, Bilgic, & Ersoy, 2008). The fact that children have to spend most of their time indoors due to the curfew imposed during the pandemic is a very restrictive situation in terms of movement and it is very difficult to perform activities such as jumping, jumping, running or balance movements, which are important for the development of large muscular motor skills, in the home environment. This restriction of movement can become an important risk factor for physical and motor development due to the negative effects of both the growth and muscle development of children and the risks of obesity and diseases such as chronic diseases and muscle diseases. If these sedentary lifestyles are maintained after the pandemic, all the risks that may arise can reach more significant dimensions for human health.

Unhealthy nutrition: One of the risk factors that can hinder or negatively affect the physical and motor development of the child is an unhealthy nutrition (Arli, Sanlier, Kucukkomurler & Yaman, 2017). Since pre-school is a period in which growth and development continue, unhealthy eating during this period is a risk factor that can cause disturbances in the physical and motor development of the child.

Less opportunity for outdoor play: The increasing interest of researchers in extracurricular learning environments has also drawn attention in recent years to outdoor activities (Alhassan, Sirard, & Robinson, 2007; Aktas Arnas & Sarıbas, 2020; Lundy & Trawick-Smith, 2020). MoNE 2013 Preschool Program Book also draws attention to the importance of outdoor activities and recommends not relying on the classroom for planning activities and using garden facilities at the highest level. Playing outdoors is an important activity that gives the child the opportunity to move in the fresh air and move freely. Restrictions experienced during the pandemic process can become a developmental risk factor as children reduce their ability to play outdoors.

Risk factors for social development

In terms of the social development of the child in the preschool period, establishing relationships with people of different age groups and observing and modeling relationships between other people has an important place (Gulay, 2009). Risk factors from the perspective of social development in pre-school were assessed on the basis of the child's relationships with people and disturbances in friendships, kinship and neighborly relationships were discussed.

Disturbances in the relationship with friends: Preschool is a critical time for the socialization of the child as well as for all areas of development. In this time, friendship relations have an important place both in terms of the socialization of the child and the right to play (Wang, Palonen, Hurme & Kinos, 2019). However, the nature of the fight against the pandemic, which limits human relations, has also interrupted the friendships of the children. This situation may become an even more important risk factor for social development, especially for children without siblings.

Disturbances in kinship relations: One of the most important relationships in terms of social development is kinship relations. One of the issues highlighted in the literature is that in recent years there has been a weakening of kinship relations due to reasons such as migration from the village to the city, changes in family structure, working conditions of families regardless of the pandemic (Abay & Demir, 2014). In addition to this weakening, it is thought that the disorders that can occur as a result of the pandemic can shake relations between relatives and, in this case, could be an important risk factor for both the social development of the child and the social structure.

Neighborly relationships disruptions: One of the relationships affected by the pandemic is neighborly relations, which have an important place in pre-school life for children to acquire values such as

cooperation, solidarity and solidarity and to observe social relationships, but just like kinship in society, it is one of the relationships that has weakened in recent years, especially in cities (Abay & Demir, 2014). It should not be forgotten that pandemic disturbances in neighborhood relations, which are currently tending to weaken, may pose a risk in terms of socialization and the assumption of social roles for preschool children.

Risk factors for emotional development

Fear, anxiety, guilt: Isolation at home due to the precautions taken in the context of the pandemic, domestic conversations about Covid 19 disease, news that is reflected in the media, the presence of sufferers in the immediate vicinity of the child, the possibility of being infected with the virus, the concern of parents towards the child in preschool. For the child, this can be a source of fear and anxiety (Cikrikci, 2020). If the family is not aware of the situations in which the child may be afraid and fearful and the child is insensitive to the emotional state, the perceived fears and anxieties can turn into psychological problems and pose a significant risk to the emotional development of the child. Furthermore, depending on the stage of development at which the child is at, it may think that negative things are due to its erroneous thoughts or behaviors. Thoughts such as the self-guilt of the child for the illness and the illness as punishment for his / her misconduct are an important risk factor for the emotional development of the child. Adults must be aware of this risk.

Difficulties in family relationships due to the pandemic: One of the relationships affected by the pandemic are family relationships (Brown, Doom, Lechuga-Pena, Watamura, & Koppels, 2020). Especially if one of the parents works in a profession with a high risk of coronavirus, such as a health worker, freight worker, or if the coronavirus test is positive, isolation from the family home or living in a separate house can interrupt the relationship of the child with its parent. Restricting or losing the relationship with the child's parent can be a risk factor that can negatively affect its emotional development if no necessary precautions are taken.

Parental stress: Many changes have also occurred in the lives of adults associated with the pandemic: Parental stress levels may change compared to normal time due to factors such as the weakening of human relationships due to isolation, reduced opportunities for social support, changes in working life and economic difficulties (Brown, Doom, Lechuga-Pena, Watamura, & Koppels, 2020). There is evidence in the literature that parent stress affects their relationship with the child and increases the possibility of negative behaviors towards the child (Rodriguez-JenKins, & Marcenko, 2014). Disorders in the parent-child relationship due to the stress caused by the pandemic can become a risk factor for the emotional development of the child.

Dissemination of information that is not suitable for the development of the child: During the pandemic process, speeches about the disease are often used both within the family and in the mass media. In pre-school, the child cannot think abstractly in the cognitive sense and cannot understand certain concepts relating to language development. At this time, communication between parents or the news they watch on television may contain content that can cause anxiety or anxiety in children and jeopardize their emotional development (Brooks et al. 2020).

Risk factors for cognitive and linguistic development

Increasing use of digital technologies: Factors such as the lack of creative opportunities for families in terms of activities that children will engage in at home during the pandemic process, the need for some parents to work from home, and continuing education activities using digital means during distance learning have increased the use of digital technologies in this process (Cikrikci, 2020). If the use of digital technologies becomes a habit, this is an important risk factor for the cognitive and linguistic development of the child, as well as for all other areas of development and health.

Discontinuation of education: One of the measures taken to combat the pandemic is face-to-face discontinuation of personal education, which has led to efforts to support children pedagogically with opportunities such as distance learning and support from EBA (Ozer, 2020). In cases where face-to-face

education is not available, alternative education approaches can only be successful if families provide adequate support. However, pre-school education is still a level of education that some parents do not fully understand its importance in our society and that they still perceive as a care service rather than an education level (Can & Kilic, 2019). However, research on the contribution of pre-school education to development, its role in school preparation and its long-term impact shows the importance of pre-school education. Therefore, in this process, pre-school education services are not supported sufficiently by families at home and inequality of opportunity among children in accessing technological tools may create a developmental risk factor, especially for children from disadvantaged regions.

Protective factors

Communication in the family: In the environment in which the child is, parents should be attentive in their talk about the disease, the child should be talked about the disease and how to protect it below the level of cognitive and linguistic development, so that it might be possible both for the child to behave appropriately and to prevent the fear that the child might experience as a result of the pandemic (Chanchlani, Buchanan, & Gill pandemic in 2020). Particularly when it comes to issues such as deaths, unemployment and the closure of care homes, one should be careful, bearing in mind that there can be fears. Also, strong intra-family communication and the ability of the child to easily ask about the issues they are curious about can play a protective role in the development of the child (Dalton, Rapa, & Stein, 2020).

Healthy nutrition: One of the most effective factors for the physical and motor development of children is a healthy nutrition. Healthy nutrition is important for growth and development, strengthens the immune system and the ability of the body to fight diseases in the event of illness (Arlı, Sanlier, Kucukkomurler, & Yaman, 2017). Families that consciously behave in terms of adequate and balanced nutrition of the child and regular meals will be an important protective factor for the development of the child (Akseer, Kandru, Keats & Bhutta, 2020).

Establishing life routines: Since pre-school is a time when habits are established and the importance of routines for the child to feel safe ensures that the child's daily life routines are maintained by the parents during the pandemic process, such as sleep, nutrition, education, play, can give the child strength. It can be a protective factor that conveys the message that has been given and eliminate possible adjustment problems that may arise after the pandemic (Kuru Gonen, 2020).

Educational assistance: During the period when pandemic education is suspended, distance learning support offered by their teachers to children continuing their pre-school and home education activities by families can act as a protective factor by preventing losses that may occur in terms of children's development (Jena, 2020). Supporting children with activities that parents can do at home, such as daily reading of stories, playing with plasticine, art activities after kindergarten broadcast by EBA TV, giving each child the opportunity to receive distance learning, assigning appropriate household responsibilities to the child, translating these into moments of communication and trying to support language development are some of the applications that can be useful.

Relationship maintenance: Man is a social and social being. He must establish and maintain relationships with the people in his community. Maintaining human relations with technological institutions, talking with photos about old memories, talking about the return of life to normality, can be protective for the development of the child, so that the relationship losses caused by the pandemic process have no negative effects during and after the pandemic.

Offering the possibility of expressing emotions: Like all human beings, children can have emotional difficulties during the pandemic process. It is important to offer the child opportunities to express his feelings such as longing and fear. Parents who speak about their feelings and express them appropriately can be a role model for the child. The ability of the child to express his emotions can be a protective factor that can help prevent emotional and behavioral problems that he may experience (Khan, & Huremović, 2019; Marmarosh, Forsyth, Strauss, & Burlingame, 2020).

Walks in nature, outdoor activities: During the pandemic process, the child should be taken by parents for walks in nature with the necessary precautions, during the hours in which they can go out, have the opportunity to spend time outdoors, which provides an opportunity for physical activity in terms of physical-motor development and eliminates the feeling of limitation caused by staying home in terms of emotional development (Mart & Kesicioglu, 2020; Mart, Alisinanoglu, & Kesicioglu, 2015). During these walks, parents can also support the child in terms of cognitive and linguistic development by telling stories, talking about what they see, and playing games.

Supporting the right to play: The place and importance of play for the development of the child is an issue that is accepted and agreed upon by the scientific world. Every child has the right to play, such as food, drink, safety and housing rights (Hughes, 2010). The fact that the playground is limited to the home environment during the pandemic process and the playmate restricts it to people living at home should not eliminate the child's right to play. On the contrary, with the creative solutions to be found by parents, constructing indoor games with the child can, if possible, turn a room at home into a playroom, play a protective role by strengthening relationships with the child and supporting the child's right to play what can be a protective role (Mart & Kesicioglu, 2020).

Indoor sports and exercise activities: Playing sports and exercise-based games in the house to eliminate the problems caused by movement restrictions during the pandemic process by creating a suitable area in which the child can perform movements such as running, jumping, jumping, crawling and sports activities for the parents themselves. As a model from the theme, it will be playing a protective factor role for the development and health of the child (Caner, Unal, Apaydin, Dag, Okur, Kara et al. 2020).

Planning alternative activities: Planning alternative activities such as domestic artistic activities, mandala activities, hobbies, plant breeding, animal feeding for children during the pandemic process can be a resource for the effective use of the child's time and emotional well-being and can act as a protective factor (Kuru Gonen, 2020).

Teaching hygiene rules: Compliance with hygiene rules is an effective factor in preventing diseases. During the pandemic process, hygiene rules, whose vital importance is understood once more, should be explained to the child through games, drama and storytelling in accordance with his developmental level. In addition, providing positive role models on these issues by adults can contribute to the child's development of correct behavior. The child's adoption of hygiene behaviors can be considered as a protective factor on his health and therefore his development.

CONCLUSION

During the pandemic process, which was handled in the light of the theoretical framework and research results, an attempt was made to evaluate what protective factors might be and what risk factors might be for preschool children. It is believed that the risk factors presented can raise awareness by drawing the attention of families and that protective factors can guide families in doing so. It can also be a guide for assessment studies relating to the relevant risks for the post-pandemic period.

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The Long and Short-Term Effects of Problems Experienced by Young Children in Their Peer Relationships on Social and Emotional Development

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ABSTRACT

The purpose of this study is to examine the long and short-term effects of aggressive behaviour with peers, asocial behaviours with peers, and excluded by peers levels of preschool children on the social-emotional variables (making contact-social performance and self-control-thoughtfulness). In this study, where five-year-old children were included, the pre-school education teachers completed the Child Behaviour Scale (aggressive with peers, asocial behaviours with peers and excluded by peers subscales) and Social-Emotional Well-Being and Resilience Scale (making contact-social performance and self-control-thoughtfulness subscales). According to the findings of the study, the problems in peer relationships decreased in the second measurements compared to the first measurements, while the social-emotional variables increased in the second measurements compared to the first measurements. In the study, the three problems faced in peer relationships predicted at least one of the social-emotional well-being variables both in the short-term and the long-term. This result may be interpreted as the fact that peer relationships have strong effects on social and emotional development.

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INTRODUCTION

Preschool period is a period of time when the peer relationships, social-emotional well-being and resilience variables develop. The development in the first years of life has a power to affect the subsequent years (Gülay 2011; Ladd 1999). Preschool period is an important time for children to acquire social and emotional competencies (Dobrin & Kallay, 2013). Social-emotional competencies include the concepts of self-regulation, social awareness, social problem-solving, peer relationships and social skills (Denham et al., 2014). Social-emotional competencies are closely associated with the concepts of well-being and resilience (Erbay, & Durmuşoğlu Saltalı, 2020). Well-being concerns the daily life of individuals. Thus, it is perfectly natural for adults to care about their children's well-being (Mayr & Ulich, 2009). Effects on the physical and emotional health in childhood may remain for a life-time (Ray et al, 2020). Resilience is the capacity for a person to survive difficulties and successfully adapt to these difficulties (Masten, 2014). In fact, it is a dynamic process expressing adaptation in a positive direction (Luthar, Cicchetti, & Becker 2000, p.543). Howell et al., (2010) stated that resilience develops pre-school emotion regulation and prosocial skills. Social and emotional competence may either ease or complicate children's life, according to its degree (Denham et al., 2009). Social and emotional development which progresses in a healthy way, develops abilities such as establishing positive relationships, developing a positive sense of self, effectively expressing feelings and regulating emotions, successfully performing difficult tasks and developing a positive viewpoint (Oades Robinson & Green 2011; Shonkoff & Phillips, 2000). As a result of their study based on observations and interviews which took about nine months, Kirk and Jay (2018) found that the environment, plays and relationships in preschool classrooms supported the social and emotional development of children. Any setback in one of these three elements affected the others negatively.

Peer relationships facilitate the process of knowing themselves as from childhood and help to see their abilities and limits. When young children start preschool education, they realize that they are a member of a crowded group. Peers and peer relationships begin to develop and to affect the child's development both directly and indirectly (especially during plays) (Kruszewska & Kocot, 2019). Children who develop positive relationships with their peers develop a positive sense of self that provides resilience (Mihaela, 2015). Within the scope of this study, aggression, asocial behaviours and exclusion were addressed as peer problems. Social exclusion and peer rejection are the phenomenon that may commonly be encountered in social interactions of children and adolescents. Exclusion and rejection may arise due to a number of reasons and these experiences may have harmful consequences in terms of emotional and behavioural health (Killen & Rutland, 2011). Aggression, which can be encountered in the first years of life, may continue in the subsequent years (Campbell, 2002; Olweus, 1979). Asocial behaviour contains aggression, as well as negative behaviours such as impulsivity, hostility toward authority, noncompliance, and defiance (Chacko, Anderson & Rajwan, 2013). The aggression, asocial behaviours, and exclusion variables are the peer problems that may be in interaction. Children, who display aggressive behaviours toward their peers, may be excluded by them and may also display asocial behaviours outside aggression (Bayat & Jamnia, 2019). Similarly excluded children may display behavioural problems like aggression in the course of time. This necessitates approaching peer relationships in the preschool period more carefully. Peer relationships in the first years of life may affect social-emotional well-being in both kindergarten and in the subsequent years. In a study conducted by Öneren Şendil and Tantekin Erden (2014) with 42 preschool children, they found that as children's peer preference levels increased, their social competence levels also increased. Likewise, a lower peer preference level was found to be associated with social incompetence. In their longitudinal study conducted in Canada, Guhn et al., (2016) followed preschool children until the fourth grade in the primary school. They found that teacher-rated social competence in kindergarten most strongly predicted 4th graders' self-report of their connectedness to peers, and emotional maturity most strongly predicted emotional well-being (Guhn et al., 2016). The studies on peer rejection and victimisation suggest that negative social experiences may ruin children's emotional well-being, hinder their socio-

emotional development, and make them defenceless against peer experiences in the future (Stenseng et al., 2015).

In recent years, there has been an increase in the number of studies on the peer relationships, social-emotional well-being and resilience variables in Turkey. However, the number of longitudinal studies examining peer relationships in Turkey is limited (Gülay Ogelman & Erten Sarıkaya, 2013). It is believed that this study will guide relevant future studies especially in Turkey. Increasing relevant longitudinal studies is crucial for revealing the variables which affect the social and emotional development of young children and following the process.

Aim of the Study

The purpose of this study is to examine the long and short-term effects of aggressive behaviour with peers, asocial behaviours with peers, and excluded by peers levels of preschool children on the social-emotional well-being and psychological resilience variables. In this context, the subgoals of the study are as follows:

- Do the variables of peer relationships (aggressive behaviour with peers, excluded by peers and asocial behaviours with peers) in the autumn term have a predictive effect on the social-emotional well-being and psychological resilience variables (making contact-social performance and self-control-thoughtfulness) in the same term?

- Do the variables of peer relationships (aggressive behaviour with peers, excluded by peers and asocial behaviours with peers) in the autumn term have a predictive effect on the social-emotional well-being and psychological resilience variables (making contact-social performance and self-control-thoughtfulness) in the spring term?

- Do the variables of peer relationships (aggressive behaviour with peers, excluded by peers and asocial behaviours with peers) in the spring term have a predictive effect on the social-emotional well-being and psychological resilience variables (making contact-social performance and self-control-thoughtfulness) in the same term?

METHOD

Participants

Five-year-old children (19 boys (47.5%), 21 girls (52.5%)), attending preschool education and showing normal developmental characteristics, were included in the study. The average age of children is 5 years, 3 months, 27 days (minimum 5 years, 3 days; maximum 5 years, 7 months, 9 days). All of the children live with their parents.

Research Instruments and Processes

The Child Behaviour Scale (Aggressive with peers, asocial behaviours with peers and excluded by peers subscales): It is a measurement tool developed by Gary W. Ladd and Suzan M. Profilet in 1996 to evaluate the peer relationships of preschool children according to the information provided by teachers. The scale consists of six subscales and a total of 44 items. The subscales are as follows: Aggression with peers, prosocial behaviours with peers, asocial behaviours with peers, anxiety-fear, exclusion by peers, hyperactivity-distractibility. Items are scored as “Never”, “Sometimes”, and “Always” (Ladd & Profilet, 1996). Child Behaviour Scale was adapted to Turkish in 2008 (Gülay, 2008). In the measurement tool, the subscales are evaluated independently. Scores obtained from the scale indicate levels in various dimensions regarding peer relationships. Higher scores signify that this dimension is encountered more often and lower scores signify that the dimension is encountered less often. In this study, aggressive with peers, asocial behaviours with peers and excluded by peers subscales were used. Internal consistency coefficients of the subscales within the scope of the study were .79 for aggressive with peers subscale, .84 for asocial behaviours with peers subscale, and .88 for excluded by peers subscale.

Social-Emotional Well-Being and Resilience Scale (PERIK-in English: Positive development and resilience in kindergarten) (Making contact-social performance and self-control-thoughtfulness subscales): (Mayr and Ulich (2006) focused on well-being positive development concepts when developing this assessment tool. PERIK was developed based on the concepts of mental health, resilience, and school readiness. In a recent study related to the scale, the final form of the scale with six subscales and 36 items, was attained (Mayr & Ulich, 2009). The scale consists of five subscales. The subscales are as follows: Making contact-social performance, self-control-thoughtfulness, self-assertiveness, emotional stability-coping with stress, task orientation and pleasure in exploring. The scoring of the five- point likert scale is performed as follows: "Always=5, Usually=4, Partly=3, Seldomly=2, Never=1". The highest and lowest scores to be obtained from each subscale are 30 and 1, respectively. The scale is completed by teachers in the name of children. PERIK was adapted to Turkish in 2018 (Durmuşoğlu Saltalı et al., 2018). In this study, making contact-social performance and self-control-thoughtfulness subscales were used. Within the scope of the study, the internal consistency coefficient was found to be .92 for the making contact-social performance subscale and .92 for the self-control-thoughtfulness subscale.

Application

In this study, the preschool education teachers completed the Child Behaviour Scale and Social-Emotional Well-Being and Resilience Scale for each child twice (autumn and spring). The teachers were informed about the topic and assessment instruments before the study.

Data analysis

Simple linear regression analysis was applied in the study. Büyüköztürk (2004, p. 87) defined regression analysis as a process of distinguishing one of two or more interrelated variables as dependent variable and the others as independent variable and explaining the correlation between them with a mathematical equation. Additionally, it is stated that if the dependent variable is one and the independent variable is also one in regression analysis, the Simple Linear Regression Analysis will be used (Büyüköztürk, 2004, p. 87).

FINDINGS

Table 1. *Results of correlation coefficients and simple linear regression analysis on the exclusion by peers and social-emotional well-being, resilience variables*

Variables	r	R	R^2	*F*	Std. E.	ß	t	p
Excluded-A*								
Making contact, social performance- A*	-.692****	.692	.479	34.943	.066	-.692	-5.911	.000*****
Excluded- A.*								
Self-control, thoughtfulness-A.*	-.561****	.561	.315	17.470	.087	-.561	-4.180	.000*****
Excluded-A.*								
Making contact, social performance- S.**	-.638****	.638	.407	26.030	.092	-.638	-5.102	.000*****
Excluded- A.*								
Self-control, thoughtfulness-S. **	-.556****	.556	.309	17.002	.098	-.556	-4.123	.000*****
Excluded- S.**								
Making contact, social performance- S.**	-.648****	.648	.420	27.570	.066	-.648	-5.251	.000*****
Excluded- S.**								
Self-control, thoughtfulness-S**	-.359***	.359	.129	5.636	.080	-.359	-2.374	.023***

* A: Autumn ** S: Spring *** *p<.005,* **** *p<.001,* ***** *p<.000*

According to Table 1, the first measurement performed in the autumn term showed that the excluded level had a negative significant correlation with the making contact and social performance (r=.-692), self-control, thoughtfulness (r=-.561) levels in the same term (p<.001). As the excluded level increased, the social-emotional well-being and resilience variables decreased and as the excluded level decreased, the social-emotional well-being and resilience variables increased. The excluded level in the autumn term significantly predicted the levels of making contact and social performance (R=.692, R^2= .479, *F*= 34.943, p<.000), self-control, thoughtfulness (R=.561, R^2= .315, *F*= 17.470, p<.000) in the same term.

According to Table 1, the excluded level in the autumn term had a negative significant correlation with the levels of making contact and social performance (r=.-638), self-control, thoughtfulness (r=-.556) in the spring term (p<.001). As the excluded level in the autumn term increased, the social-emotional well-being and resilience variables in the spring term decreased and as the excluded level decreased, the social-emotional well-being and resilience variables increased. The excluded level in the autumn term significantly predicted the levels of making contact and social performance (R=.638, R^2= .407, *F*= 26.030, p<.000), self-control, thoughtfulness (R=.556, R^2= .309, *F*= 17.002, p<.000) in the spring term.

In Table 1, the excluded level in the spring term had a negative significant correlation with the making contact and social performance (r=.-648; p<.001), self-control, thoughtfulness (r=-.359; p<.005). As the excluded level increased, the social-emotional well-being and resilience variables decreased and as the excluded level decreased, the social-emotional well-being and resilience variables increased in the same term. The excluded level in the spring term significantly predicted the levels of making contact and social performance (R=.648, R^2= .420, *F*= 27.570, p<.000) and self-control, thoughtfulness (R=.359, R^2= .129, *F*= 5.636, p<.005) in the same term.

Table 2. *Results of correlation coefficients and simple linear regression analysis on the aggression with peers and social-emotional well-being, resilience variables*

Variables	r	R	R^2	*F*	Std. E.	ß	t	p
Aggression –A.*								
Making contact, social performance- A. *	-.326***	.326	.106	4.515	.074	-.326	-2.125	.040***
Aggression - A.*								
Self-control, thoughtfulness- A.*	-.634****	.634	.402	25.560	.070	-.634	-5.056	.000*****
Aggression – A.*								
Making contact, social performance- S.**	-.169	.169	.029	1.122	.101	-.169	-1.059	.296
Aggression - A.*								
Self-control, thoughtfulness- S.**	-.638****	.638	.407	26.082	.078	-.638	-5.107	.000*****
Aggression -S.**								
Making contact, social performance- S.**	-.214	.214	.046	1.830	.065	-.214	-1.353	.184
Aggression - S.**								
Self-control, thoughtfulness- S. **	-.495****	.495	.245	12.363	.057	-.495	-3.516	.001****

* A: Autumn ** S: Spring, *** *p<.005,* **** *p<.001,* ***** *p<.000*

In Table 2, the first measurement performed in the autumn term showed that the aggression level had a negative significant correlation with the making contact and social performance (r=.-326), self-control, thoughtfulness (r=-.634) levels in the same term (p<.005, p<.001). As the aggression level increased, the social-emotional well-being and resilience variables decreased and as the aggression level decreased, the social-emotional well-being and resilience variables increased. The aggression level in the autumn term significantly predicted the levels of making contact and social performance (R=.326, R^2= .106, *F*= 4.515, p<.005) and self-control, thoughtfulness (R=.634, R^2= .402, *F*= 25.560, p<.000) in

the same term.

According to Table 2, there was a negative significant correlation between the aggression level in the autumn term and the self-control, thoughtfulness (r=-.638) level in the spring term (p<.001). As the aggression level in the autumn term increased, the self-control, thoughtfulness level in the spring term decreased and as the aggression level decreased, the self-control, thoughtfulness level increased. The aggression level in the autumn term significantly predicted the levels of self-control, thoughtfulness (R=.638, R^2= .407, *F*= 26.082, p<.000) in the spring term. The aggression level in the autumn term did not significantly predict the making contact and social performance variable in the spring term.

In Table 2, the aggression level in the spring term had a negative significant correlation with the self-control, thoughtfulness (r=-.495) (p<.001) in the same term. As the aggression level increased, the self-control, thoughtfulness variable decreased and as the aggression level decreased the self-control, thoughtfulness variable increased. The aggression level in the spring term significantly predicted the levels of self-control, thoughtfulness (R=.495, R^2= .245, *F*= 12.363, p<.001) in the same term. The aggression level in the spring term did not significantly predict the making contact and social performance variable in the same term.

Table 3. *Results of correlation coefficients and simple linear regression analysis on the asocial behaviours with peers and social-emotional well-being, resilience variables*

Variables	r	R	R^2	*F*	Std. E.	ß	t	p
Asocial B. -A*								
Making contact, social performance- A.*	-.713***	.713	.508	39.300	.063	-.713	-6.269	.000****
Asocial B.- A.*								
Self-control, thoughtfulness- A.*	-.276	.276	.076	3.122	.100	-.276	-1.767	.085
Asocial B.-A.*								
Making contact, social performance- S.**	-.635***	.635	.403	25.612	.091	-.635	-5.061	.000****
Asocial B.- A.*								
Self-control, thoughtfulness- S.**	-.294	.294	.087	3.599	.111	-.294	-1.897	.065
Asocial B.-S.**								
Making contact, social performance- S. **	-.635***	.635	.403	25.634	.087	-.635	-5.063	.000****
Asocial B.- S. **								
Self-control, thoughtfulness- S.**	-.139	.139	.019	.752	.109	-.139	-.867	.391

* A: Autumn ** S: Spring, *** *p<.001*, ***

** p<.000*

In Table 3, the first measurement performed in the autumn term showed that the asocial behaviour level had a negative significant correlation with the making contact and social performance (r=.-713) level in the same term (p<.001). As the asocial behaviour level increased, the making contact and social performance level decreased and as the asocial behaviour level decreased, the making contact and social performance level increased. The asocial behaviour level in the autumn term significantly predicted the levels of making contact, social performance (R=.713, R^2= .508, *F*= 39.300, p<.000) in the same term. The asocial behaviour level in the autumn term did not significantly predict the self-control, thoughtfulness in the same term.

According to Table 3, there was a negative significant correlation between the asocial behaviour level in the autumn term and the making contact and social performance (r=.-635) in the spring term (p<.001). As the asocial behaviour level in the autumn term increased, the making contact, social performance level in the spring term decreased and as the asocial behaviour level decreased, the making contact, social performance level increased. The asocial behaviour level in the autumn term significantly predicted the levels of making contact, social performance (R=.635, R^2= .403, *F*= 25.612,

p<.000) in the spring term. The asocial behaviour level in the autumn term did not significantly predict the self-control, thoughtfulness variable in the spring term.

In Table 3, the asocial behaviour level in the spring term had a negative significant correlation with the making contact and social performance (r=.-635) level in the same term (p<.001). As the asocial behaviour level increased, the making contact and social performance in the spring term decreased and as the asocial behaviour level decreased, the making contact and social performance level increased. The asocial behaviour level in the spring term significantly predicted the levels of making contact, social performance (R=.635, R^2= .403, F= 25.634, p<.000) in the same term. The asocial behaviour level in the spring term did not significantly predict the self-control, thoughtfulness variables variable in the same term.

DISCUSSION, CONCLUSION, RECOMMENDATIONS

According to the results of the study; the problems experienced by young children in their peer relationships had long-term and short-term effects on social-emotional well-being and resilience while excluded by peers significantly predicted the making contact, social performance and self-control, thoughtfulness levels in the long and short terms.

The aggression level in the autumn term significantly predicted the levels of making contact and social performance and self-control, thoughtfulness in the same term. The aggression level in the autumn term significantly predicted the level of self-control, thoughtfulness in the spring term. The aggression level in the autumn term did not significantly predict the making contact and social performance in the spring term. The aggression level in the spring term significantly predicted the levels of self-control, thoughtfulness in the same term. The aggression level in the spring term did not significantly predict the making contact and social performance variable in the same term. As is seen, aggression toward peers predicted the social-emotional well-being and resilience variables at the beginning of the school year; whereas, it predicted only one variable (self-control, thoughtfulness) in the long term. Aggression in the spring term predicted one variable (self-control, thoughtfulness) in the same term. This may be interpreted as the fact that aggression was no longer effective on social-emotional well-being and resilience.

The asocial behaviour level in the autumn term significantly predicted the levels of making contact and social performance in the same term. The asocial behaviour level in the autumn term did not significantly predict the self-control, thoughtfulness variable in the same term. The asocial behaviour level in the autumn term significantly predicted the levels of making contact, social performance in the spring term. The asocial behaviour level in the autumn term did not significantly predict the self-control, thoughtfulness variable in the spring term. The asocial behaviour level in the spring term significantly predicted the levels of making contact and social performance in the same term. The asocial behaviour level in the spring term did not significantly predict the self-control, thoughtfulness variables variable in the same term. As is seen, in the study the three problems experienced in peer relationships predicted at least one of the social-emotional well-being variables both in the short and the long term. This result may be interpreted as the fact that peer relationships have strong effects on social and emotional development.

The fact that the problems experienced in peer relationships predicted the social-emotional well-being and resilience variables in the long and short terms, is one of the results supported with several studies in the literature. For example, in a study in which 133 girls and 134 boys who are five and a half years old were tracked from kindergarten until the fourth grade (Schrepferman et al., 2006), the correlation between peer relationships and depression was examined. According to the results of the study, it was determined that peer interaction and affinity in kindergarten was a protective factor against depression in the primary school period. It was stated that establishing close relationships with peers and having peer support could support social skill development and sense of trust. It is indicated that

children who have weak communication skills, generate aggressive solutions to interpersonal problems and are unable to collaborate with their peers, are rejected, criticized and punished by their peers (Climie & Deen, 2014). Such problems in peer relationships may negatively affect social and emotional development. Also, school-based violence prevention programs aim to develop social and emotional well-being, resilience, empathy and prosocial skills (Thompson, 2002). In the study conducted by Gazelle and Ladd (2003) in which they followed 388 children from kindergarten until the fourth grade, they determined that the combination of anxious solitude and peer excluded predicted depressive symptoms in the subsequent years.

While asocial behaviour did not significantly predict the self-control, thoughtfulness level in the long and short terms. This makes us think that there may be stronger variables than peer relationships to predict self-control and thoughtfulness. In their review study, Zimmer-Gembeck et al., (2015), stated that in some studies parent-child attachment was found to be associated with children's emotion regulation and coping skills. Smith and Carlson (1997) indicated that peers, as well as family variables, temperament and gender variables also might be among protective and risk factors affecting the resilience level. Shonkoff and Philips (2000) stated that social-emotional skills may also be associated with variables such as self-confidence, positive relationships with adults, and concentration. Fiorelli and Russ (2012) stated that opportunities for pretend play were significantly related to the measures of subjective well-being.

It was found that among the three variables discussed as peer problems within the scope of the study, aggression had gradually lost its predicting effect in the course of time. This may partially be explained with the decrease of children's aggression level and the increase of positive skills such as establishing social relations in the second term. The mean score of aggression was found to be 8.97 for the autumn term and 8.35 for the spring term. The excluded mean score was 8.87 in the first measurement and 8.70 in the second measurement. The asocial behaviour mean score was 8.92 in the first measurement and 8.47 in the second measurement. As is seen, there was a decrease in the mean scores in peer relationship problems discussed within the scope of the study, within the term. The skill of establishing social relations increased as 18.20 for the autumn term and 20.83 for the spring term. Self-control was found to be 18.93 for the autumn term and it increased to 20.63 in the spring term. In line with the findings, it was observed that the Social-Emotional Well-Being and Resilience variables increased within the term. In addition, aggression might have decreased and positive skills might have increased owing to factors progressing in the course of time, such as the maturation of classroom management approach and development of teacher-child and child-child relationships. Children's aggression may decrease with developmental maturation in the course of time (NICHD ECRN, 2004). Gülay Ogelman and Erten Sarıkaya (2013) tracked peer relationships of 78 Turkish children whose ages differ from five to six, for two years. According to the general results of the study; while aggression levels, asocial behaviour levels, anxious-fearful levels, exclusion levels and peer victimization levels of preschool children decrease at the age of 6, their prosocial behaviour levels increase at the age of 6 (Gülay Ogelman & Erten Sarıkaya, 2013). In a longitudinal study conducted by McTaggart, McGill and Stephens (2020), 100 young children were observed in preschool education for three terms in terms of social and emotional competencies. According to the findings of the study it was found that social emotional competencies increased at the end of the third term. Also, in the study it was reported that emotional competencies had higher levels of competencies compared to social competencies (McTaggart, McGill, & Stephens, 2020). As is seen, children's negative behaviours may decrease, while their positive behaviours may increase in preschool education. This can be explained with the effects of new social and emotional skills learned by children in the course of time, as well as maturation and positive relationships with peers and teachers (Durmuşoğlu Saltalı & Erbay, 2020). Lindsey (2019) evaluated 122 young children from different ethnic groups in terms of peer competencies and emotional competencies for two years. In the findings of the study, the expression of happiness in the first year predicted the social competence in the second year. In addition, the anger and

sadness in the first year predicted the lower peer social competence in the second year. In line with a variety of examples presented in this study and relevant studies, it is revealed that there are high-level correlations between the peer relationships and social-emotional well-being of young children. The structure of children's peer interactions may cause them to take positive and negative behaviours as a model, acquire new skills, get excluded from the group, become lonely and be unable to find social interaction opportunities. Thus, young children's development of positive peer relationships should be among the priorities of teachers throughout the term.

The results of this study revealed that young children's peer relationships may affect their social and emotional development in the long and short terms. In accordance with the limitations and results, future longitudinal studies can be increased with more crowded study groups in a longer term. Longitudinal studies can be increased more often in countries like Turkey, where relevant studies are not adequate in number. With intercultural studies, young children from different cultures can be compared in accordance with the peer relationships, social-emotional well-being, and resilience variables. Training and counselling services can be provided to preschool education teachers in order to enable them to follow children's peer relationships and emotional and social skills regularly. Studies on the emotional stability/coping with stress variable can be generalized and the variables affecting this skill can be revealed.

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Review of Articles Related to Mixed Reality in Education

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ABSTRACT

With the development of technology, there have been developments in the field of education as in every field. Among these developments, it can be said that the most important developments regarding educational environments are reality technologies. These technologies can be divided into three categories as virtual reality, augmented reality and mixed reality. Since mixed reality, one of these technologies, is a combination of virtual and augmented reality, it is thought that studies in this field will contribute to studies in other realities. In this study, the articles using mixed reality technologies were systematically examined. After the examination, the articles were evaluated and classified according to the criteria determined. With the study, the distributions of the articles on mixed reality in the field of education between years 2016-2020 in the Web of Science database were found according to the determined criteria and inferences were made about these distributions. As a result of the study, it was concluded that most of the articles were published in 2020 and 2018. In addition to this result, it was determined that quantitative articles were much more than qualitative articles. It was seen that experimental-applied study was mainly chosen as the type of article. Science was found to be the most preferred learning area. It was seen that the undergraduate level was the most chosen sample level. It was determined that the questionnaire was the most chosen data collection tool. Finally, it was concluded that "50-99" and "0-24" are the most selected sample ranges in mixed reality research in education.

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INTRODUCTION

With the development of technology, different technologies have been developed in the field of education as in every field. It is possible to say that with the increase of different technologies and the methods brought by these technologies in education, the quality and efficiency of education have increased (Mikulecký, 2012). Thanks to these studies carried out in the field of education, the use of different technology fields in the field of education increases and different training methods are developed.

Some of the visual and audio technologies used in education are reality technologies. Reality technologies can be used for different purposes with different technological tools. These technologies can be used as supportive education for distance and regular education. Reality technologies can be examined in 3 areas as virtual reality, augmented reality and mixed reality.

Virtual reality is the human-computer interface that simulates an environment (Zheng et al., 1998). Thanks to virtual reality, users can be in virtual environments created and do things that they normally cannot do. It is possible to say that this system is also widely used for educational studies. As a study on this subject, Huang et al. (2010) examined students' attitudes towards virtual reality environments. While different methods related to virtual reality were examined in the study, the opinions of the participants about these methods were taken. As a result of the study, it was stated that virtual reality learning environments provide a better learning environment with the imagination of individuals.

As another study on virtual reality, Çavaş et al. (2004) provided information about the features of virtual reality technology and how virtual reality technology can be used in education. In the study, they talked about the advantages, disadvantages and usage areas of different virtual reality devices and environments. They also mentioned in which educational fields these technologies can be used appropriately. In the study, they explained the use of these technologies in the education of special education, architecture, history, science and mathematics, medicine, military and airline fields. As a result, it was stated that using virtual technologies in the field of education would significantly increase students' motivation and attitudes.

The opinions of the teacher candidates about the use of virtual reality in education are as important as the opinions of the students. Karaoğlan Yılmaz and Yılmaz (2019) examined the opinions of pre-service teachers about the use of virtual reality applications in education. They stated in the study that virtual reality technology can be preferred in fields such as science and technology, medical education and engineering. As a result of interviews with 15 pre-service teachers, it was stated that virtual reality technologies have effects such as making the learning environment enjoyable and increasing creative thinking and motivation. In addition, it was stated that some participants experienced dizziness and nausea while using this technology, and this problem may cause problems in terms of classroom management.

Another reality technology is augmented reality. Augmented reality is realized by placing 3D objects in 3D environments in real time (Azuma, 1997). The difference of this technology from virtual reality is that the real and virtual environment can be used together. This technology is frequently used in educational studies as well as in virtual reality. As a study on this technology, Wu et al. (2013) evaluated the point reached by augmented reality in the field of education and the opportunities in this field. In addition, they gave information about how augmented reality can be used for different education fields.

As another study on augmented reality, Durak and Karaoğlan Yılmaz (2019) examined the opinions of secondary school students about augmented reality educational applications of augmented reality. Secondary school students' opinions about this technology were taken and they stated the positive and negative aspects of this technology. As a result of the examination of students' opinions, it was stated that

the difference of augmented reality applications compared to traditional education was "to provide a fun educational environment and to make the learning process effective". In addition, it was stated from the students that the biggest problem in using this technology was "access to smart phones". The field of "science" was specified as education in which this technology could be most beneficial.

The last of the reality technologies is mixed reality. It is a technology that includes the concepts of mixed reality, virtual reality and augmented reality. Mixed reality is created by using real images and sounds supported by virtual images and sounds (Billinghurst & Kato, 1999). In this technology, virtual objects created in real environments can be viewed and interacted with.

Mixed reality technology is used in many different areas. One of these areas is museum and historical places. As a study on this field, Diker (2019) focused on the examination of the Troy museum with mixed reality technology in his study. In the study, museums from different parts of the world were examined and compared. In addition, the methods of using mixed reality technology in museums have been researched. As a result of the study, it was stated that the Troy Museum was in a structure suitable for mixed reality.

One of the most used fields of mixed education is the field of medical education. As a study on this subject, Birt et al. (2018) focused on the use of mobile mixed reality technologies in health and medicine. In the study, the opinions of higher education students about mixed reality technologies were taken. In addition, different mixed reality technologies have been evaluated. As a result of the study, it was stated that some users find mixed reality technology to be too complex, but it is more useful than traditional education in areas such as surface anatomy.

The aim of the study is to examine the studies related to mixed reality in the field of education and to make a systematic analysis for future studies in this field. With the study, it was aimed to determine the areas where mixed reality technologies can be used in education and the places where the usage methods are intense and sparse, and to learn from these results. While examining the articles about mixed reality and education in the study, answers to the following questions were sought:

1. What is the distribution of articles on mixed reality by years?
2. How is the distribution of articles on mixed reality according to article methods?
3. What is the distribution of articles on mixed reality according to article types?
4. How is the distribution of articles on mixed reality according to learning areas?
5. What is the distribution of articles on mixed reality according to sample levels?
6. What is the distribution of articles on mixed reality according to the number of samples?
7. How is the distribution of articles on mixed reality according to data collection tools?

METHOD

In the study, descriptive survey model was used to examine the articles. As a feature of this model, the reason for using this model can be given as the reason for the use of this model is to consider appropriate articles for generalizability of the results (Büyüköztürk, Çakmak, Akgün, Karadeniz, & Demirel, 2017).

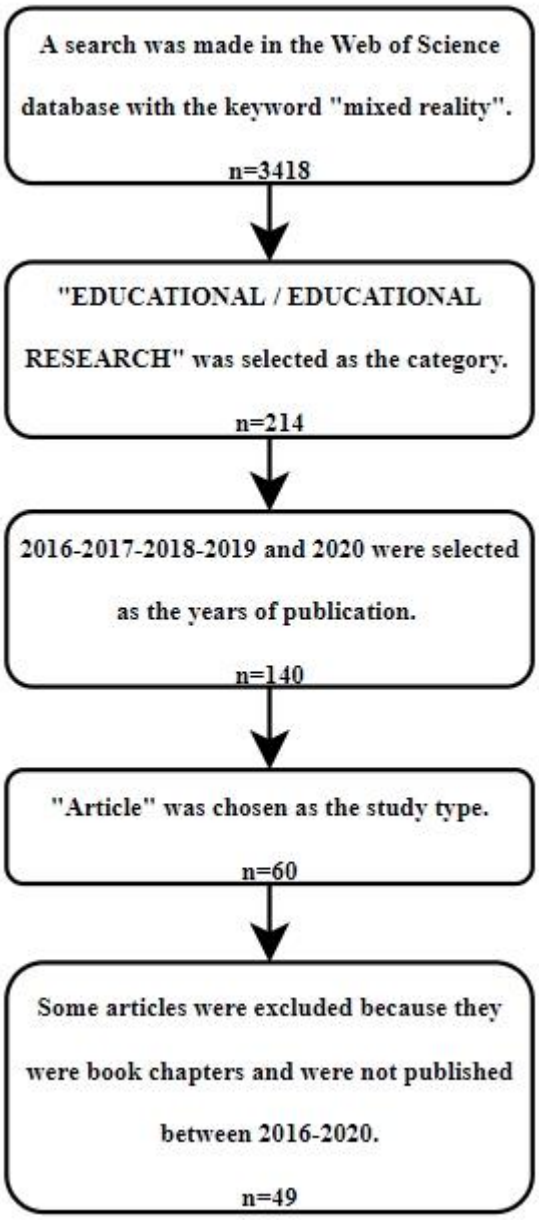

Figure 1. Article selection process

The criteria used in the selection stages of the articles are given in Figure 1. In the study, a search was made on Web of Science with "mixed reality". The search made is limited to the years 2016-2017-2018-2019 and 2020. Later, "EDUCATION / EDUCATIONAL RESEARCH" category was selected as the category. Finally, only the articles among the studies were discussed. 60 articles were found as a result of the search. As a result of the examinations, 8 articles were excluded because there are book chapters, 3 articles excluded because of open accessed in 2020 but published in 2021. After exclusions, study continued with 49 articles.

The articles were analyzed in computer environment. An article review form was created to analyze the data. In this form, criteria such as article type, article method, learning areas, sample number and level, data collection tools and article years were determined. Form 3 was created by taking the opinion of the field expert and the form was finalized.

The 49 articles obtained after the filtering were evaluated according to the criteria determined in the examination form.

FINDINGS

The findings related to the article were examined under the headings according to the answers to the questions sought as the aim of the study. Percentage values of the examined articles are given as two digits after the comma. The findings were determined by the year (Figure 2), article methods (Figure 3), article types (Figure 4), learning domains (Figure 5), sample levels (Figure 6), and sample numbers (Figure 6), respectively. Figure 7) and according to data collection tools (Figure 8).

1- Distribution of articles on mixed reality by years

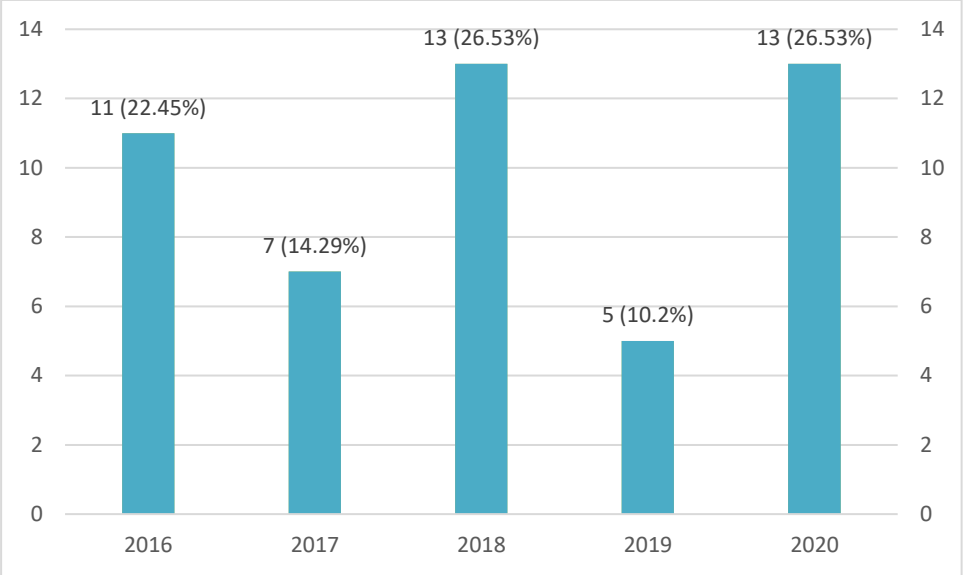

Figure 2. Distribution of articles on mixed reality by years

The distribution of the examined articles by years is shown in Figure 2. The articles were reviewed on a 5-year basis as 2020, 2019, 2018, 2017 and 2016. It was seen that the year in which the most studies were conducted on mixed reality was 2018 and 2020 (26.53%) with 13 studies. 2018 and 2020 are followed by 2016 (22.45%) with 11 articles, 2017 (14.29%) with 7 articles and 2019 (10.2%) with 5 articles.

2- Distribution of articles on mixed reality by article methods

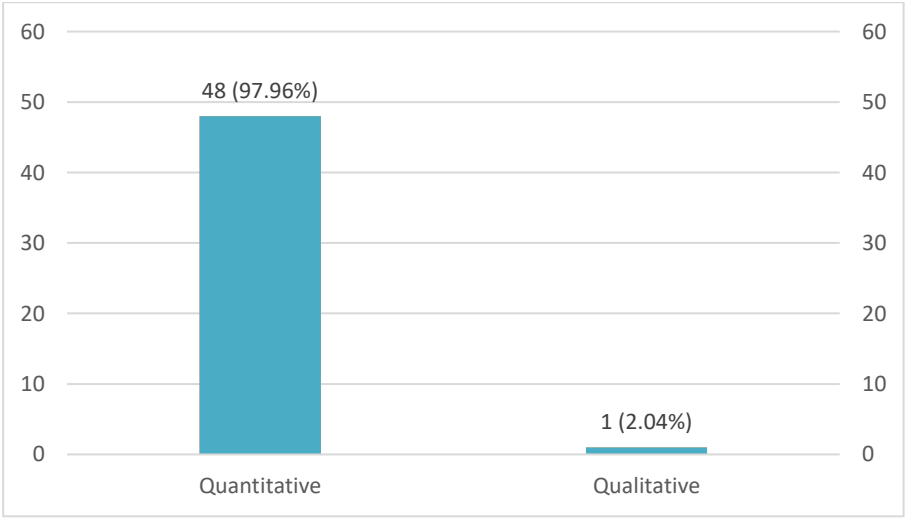

Figure 3. Distribution of articles on mixed reality by article methods

The distribution of the examined articles according to the article methods is shown in Figure 3. Articles were evaluated in two groups as quantitative and qualitative. It was seen that the most used method in studies on mixed reality was quantitative method with 48 articles (97.96%). It was found that there was only 1 article using the qualitative method (2.04%).

3- Distribution of articles on mixed reality by article types

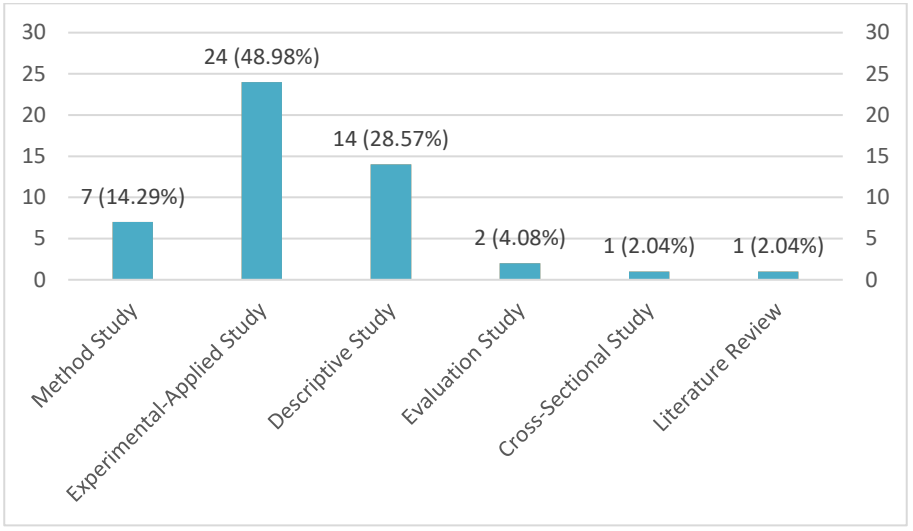

Figure 4. Distribution of articles on mixed reality by article types

The distribution of the examined articles by article types is shown in Figure 4. The articles were examined in 6 types as method study, experimental-applied study, descriptive study, evaluation study, cross-sectional study and literature review study. Considering the types of his studies on mixed reality, it is seen that the most preferred article type is experimental-applied study with 24 articles (48.98%). The experimental-applied study type is followed by descriptive study with 14 articles (28.57%), method study with 7 articles (14.29%), evaluation study with 2 articles (4.08%), and cross-sectional and literature review studies with one article (2.04%). According to the results, it can be said that descriptive and experimental-applied studies are in majority.

4- Distribution of articles on mixed reality according to learning areas

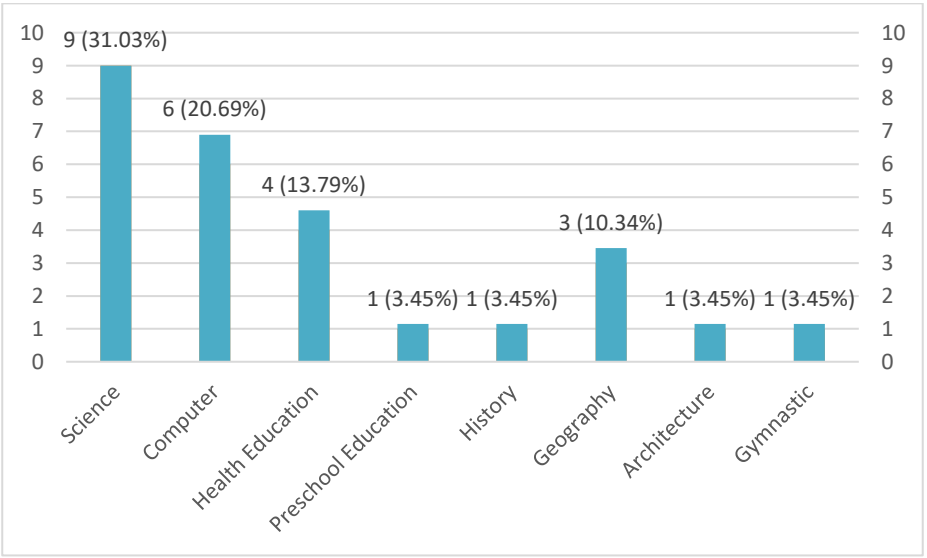

Figure 5. Distribution of articles on mixed reality according to learning areas

The distribution of the examined articles according to learning areas is shown in Figure 5. When the learning areas of his studies on mixed reality were examined, it was seen that the most studies were in the field of science with 9 articles (31.03%). The field of science was followed by computers with 6 articles (20.69%), health education with 4 articles (13.79%), geography with 3 articles (10.34%) and history, architecture, preschool education and gymnastics with 1 article (3.45%).

5- Distribution of articles on mixed reality by sample levels

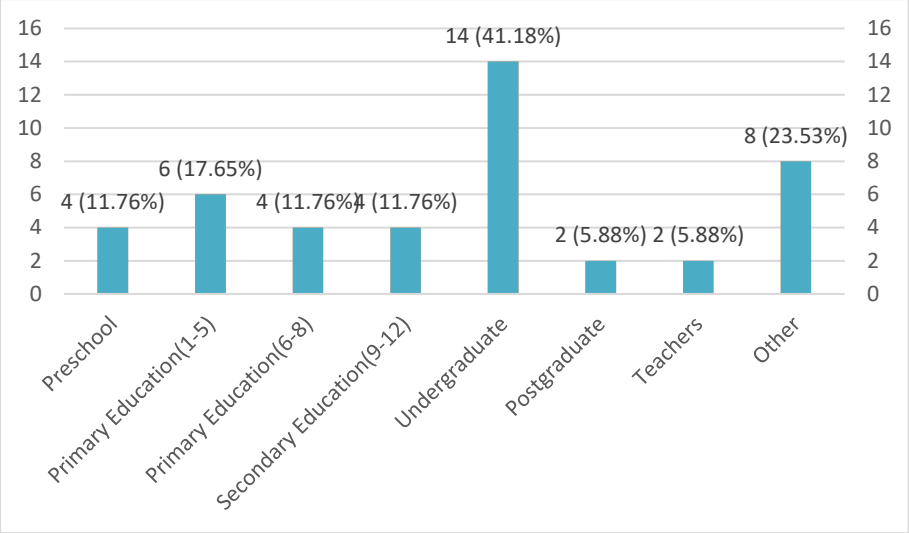

Figure 6. Distribution of articles on mixed reality by sample levels

The distribution of the examined articles according to the sample levels is shown in Figure 6. The articles were evaluated at 8 levels: pre-school, primary education (1-5), primary education (6-8), secondary education (9-12), undergraduate, graduate, teachers and other. When we look at the sample levels in the studies on mixed reality, the undergraduate sample level (41.18%) comes with 14 articles at the most. 8 articles with other sample level (23.53%), 6 articles with primary education (1-5) sample level (17.65%), 4 articles with primary education (6-8), secondary education (9-12) and preschool sample level (11.76%), 2 articles with postgraduate and teachers sampling level (5.58%), follow the undergraduate sampling level.

6- Distribution of articles on mixed reality by sample numbers

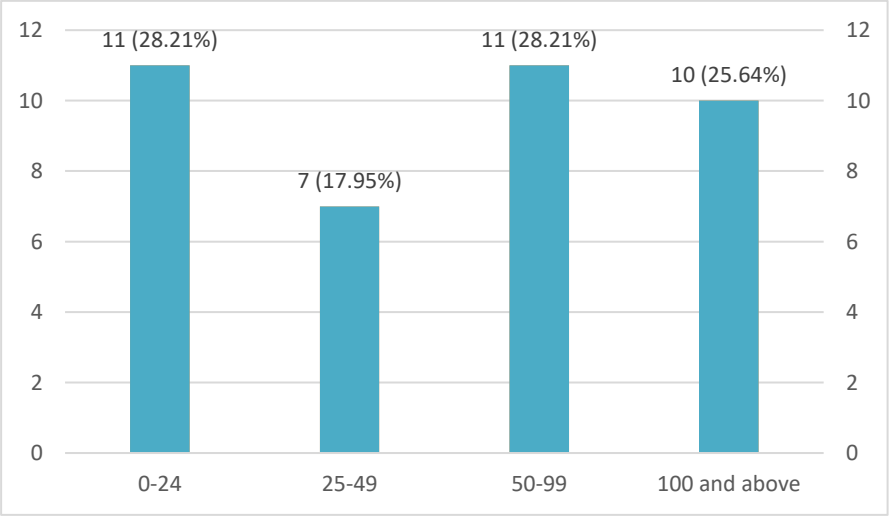

Figure 7. Distribution of articles on mixed reality by sample numbers

The distribution of the examined articles according to the sample numbers is shown in Figure 7. Articles were evaluated in 4 ranges as “0-24”, “25-49”, “50-99” and “100 and above”. In studies on mixed reality, "0-24" and “50-99” sample range (28.21%) was used mostly with 11 articles. “0-24” and “50-99” sample range was followed by 10 articles with "100 and above" sample level (25.64%) and 7 articles with “25-49” sample level (17.95%).

7- Distribution of articles on mixed reality according to data collection tools

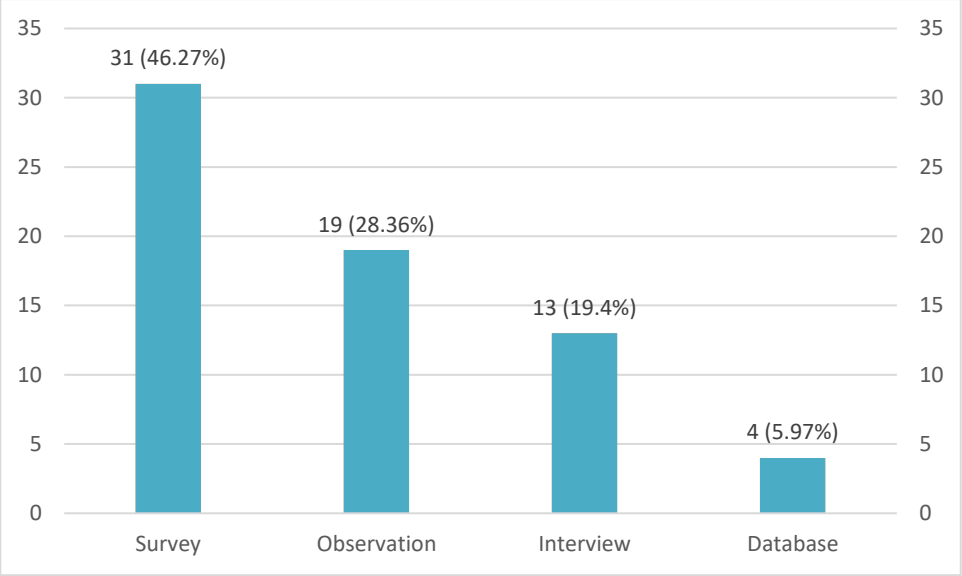

Figure 8. Distribution of articles on mixed reality according to data collection tools

The distribution of the examined articles according to the data collection tools is shown in Figure 8. The articles were evaluated in terms of four data collection tools: survey, observation, interview and database. Questionnaire with 31 articles (46.27%) is the most used data collection tool in studies on mixed reality. The survey is followed by observation with 19 articles (28.36%), interview with 13 articles (19.4%) and database with 4 articles (5.97%). According to these results, it can be said that the user survey was used in most of the studies.

CONCLUSION AND RECOMMENDATIONS

The analysis of the articles on mixed reality in the field of education has been made with the study. With the analysis, an evaluation was made according to years, article types, article methods, sample levels, sample sizes, learning areas and data collection tools. It is thought that the evaluation will help researchers who will work on these issues in the future.

In the section where the articles are examined by years, it can be interpreted that less articles were produced in 2019 on mixed reality in the field of education than in 2018 and 2020, this issue did not develop or its development slowed down in 2019. Considering this result, it is possible to say that future studies in this field will have a very important role for the field. Considering the number of articles by years, the increase and decrease in the numbers are not continuous. As a supportive study of this result, when the study of İçten and Güngör (2017) on augmented reality technology was examined, no regular increase or decrease was observed in the number of studies over the years.

When the articles were examined according to article methods, it was seen that the most used method was the quantitative methods (97.96%). Considering this value, it can be stated that most of the studies on the subject use a quantitative methods and focus on the research of the current situation in a

subject. In addition, since the qualitative methods (2.04%) is used very little, it can be predicted that a study to be done with this method in the future can advance mixed reality studies in education.

When the articles were examined according to article types, it was seen that the most used type was experimental-applied work (48.98%). In addition, it was seen that the descriptive study (28.57%) was used in a number of articles close to the experimental-applied study type. Considering these results, it is seen that most of the studies on the subject focus on three types: experimental-applied, method and descriptive work. In the evaluation, it is thought that the articles to be made with these types of studies in the future may be important in terms of the study type due to the low use of cross-sectional study (2.04%), literature review study (2.04%) and evaluation 4.08%).

With the evaluation of the articles according to their learning areas, it was determined that the majority of the articles were made in the field of science (31.03%). Computer (20.69%) and health education (13.79%) follow this area. Considering these results, it can be said that mixed reality technologies are frequently used in educational studies in the field of science. In addition, in the examination made according to the learning areas, there were gatherings in three areas intensively. Looking at this result, it can be predicted that future studies on mixed reality in different learning areas will potentially be pioneering studies in their fields. In the studies of Tekdal and Saygıner (2016), where they analyzed the studies in which augmented reality was used in the field of education, it was stated that the field of physics was the most preferred field for application. As a result, the results of the two studies on the learning area overlap with each other.

As a result of the study on the sample levels used in the articles, it was determined that the most used sample level was undergraduate (41.18%). The high number of samples (23.53%) outside the sample levels determined in the study revealed that the studies on this subject were conducted with participants from different levels. In Özdemir's (2017) study on this subject, it was stated that secondary school students were selected at the highest sampling level in studies on augmented reality. Considering this result, it can be said that different sampling levels are frequently preferred in studies on different reality technologies.

As a result of the study on the sample numbers of the articles, it was seen that the sampling range of "0-25" and “50-99” was used the most. Based on this result, it can be said that studies conducted with mixed reality are conducted with a relatively small sample. In a study that supports this result, Usta et al. (2017) examined the studies on augmented reality, and it was stated that 22 out of 33 articles in total used samples in the range of "1-10" and "11-30" as the sample size range. Considering this result, it can be said that relatively few samples are preferred in different realities.

One of the limitations of this study can be given as only the search for articles in the Web of Science database. In future studies, other databases may be included in the research. Since this research was conducted in 2021 and there may be other studies on this subject in 2021, studies in 2021 were not included in the study. For studies after 2021, it can be suggested that the articles in 2021 should be added to the research. As a suggestion for future studies on this subject, adding the environments using mixed reality devices as a category can be given. In this way, it can be determined whether mixed reality devices are preferred more in mobile or computer environment in terms of education.

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APPENDIX 1- ARTICLES EXAMINED IN STUDY

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