ISSN: 1300-915X

IOJPE

INTERNATIONAL ONLINE JOURNAL OF PRIMARY EDUCATION

International Online Journal Of Primary Education

Volume 14 Issue 4

International Online Journal of Primary Education

ISSN: 1300-915X

DECEMBER 2025

Volume 14 – Issue 4

Published in TURKEY

Contact Address:

Prof. Dr. Nergüz BULUT SERİN
Editor in Chief
European University of Lefke
Lefke, Northern Cyprus TR-10 Mersin, Turkey, 99010

Message from the Editor,

I am very pleased to inform you that we have published the fourth issue in 2025. As an editor of International Online Journal of Primary Education (IOJPE), this issue is the success of our authors, very valuable reviewers who undertook the rigorous peer review of the manuscripts, and those of the editorial board who devoted their valuable time through the review process. In this respect, I would like to thank to all reviewers, researchers and the editorial board members. The articles should be original, unpublished, and not in consideration for publication elsewhere at the time of submission to International Online Journal of Primary Education (IOJPE). For any suggestions and comments on IOJPE, please do not hesitate to send me e-mail. The countries of the authors contributed to this issue (in alphabetical order): Ethiopia, North Cyprus, and The Netherlands, Turkey.

Prof. Dr. Nergüz BULUT SERİN

Editor in Chief

ISSN: 1300-915X

Volume 14, Issue 4 (2025)

Table of Contents

Research Articles

ISSN: 1300-915X

IOJPE

ISSN: 1300 – 915X
www.iojpe.org

International Online Journal of Primary Education *2025, volume 14, issue 4*

UNDERSTANDING CHILD AGGRESSION IN EASTERN ETHIOPIAN PRIMARY SCHOOLS: INSIGHTS FROM TEACHERS' PERSPECTIVES

Gemechu Abera GOBENA
Assoc. Prof., Haramaya University,
College of Education and Behavioural Sciences, Department of Psychology, Ethiopia
ORCID: https://orcid.org/0000-0001-5285-5498
gemechu46@yahoo.com

Received: October 8, 2025 **Accepted:** December 3, 2025 **Published:** December 31, 2025

Suggested Citation:
Gobena, G. A. (2025). Understanding child aggression in Eastern Ethiopian primary schools: Insights from teachers' perspectives. *International Online Journal of Primary Education (IOJPE), 14*(4), 168-181.
https://doi.org/10.55020/iojpe.1799554

Abstract

This study sought to explore the predictors of child aggression, specifically examining the roles of gender, media exposure, sibling aggression, balanced diet, and parenting styles. A quantitative, correlational research design was employed, with data collected through standardized questionnaires completed by a sample of primary school teachers (N = 665). To analyze the relationships and predictive strength of the variables, Pearson correlation and hierarchical multiple regression analyses were utilized. The results indicated that gender was not a significant predictor of child aggression, supporting previous findings that suggest differences lie more in the type of aggression exhibited rather than in overall levels. In contrast, time spent watching television, use of computer games, sibling aggression, and parenting styles were significantly and positively associated with increased child aggression. Meanwhile, a balanced diet showed a modest negative correlation with aggression. These findings underscore the importance of environmental and familial influences over biological or demographic factors such as gender. Based on these results, the study recommends that intervention strategies focus on limiting harmful media exposure, resolving sibling conflicts, and fostering effective parenting practices. Promoting parental involvement, emotional regulation, and healthy dietary habits may also help reduce aggressive behavior in children.

Keywords: Child aggression, primary school students, demographic factors, psychology, teachers.

INTRODUCTION

Child aggression is a significant behavioral issue in developmental psychology and has drawn considerable scholarly attention due to its implications for both short- and long-term mental and social well-being (Anderson & Gentile, 2020; Bettencourt & Gross, 2020; Hubbard & Harten, 2021; Ferguson & Kilburn, 2022; Möller & Krahé, 2024). It manifests in various forms, including physical, verbal, and relational aggression. Several factors contribute to the development of aggressive behavior in children, including gender, age, media exposure, family dynamics, and nutrition. Understanding the interaction among these factors is crucial for parents, educators, and policymakers in designing effective prevention and intervention strategies (Olsson & Wester, 2024; Freeman & Johnson, 2025). The relationship between television viewing and child aggression has long been a focal point in psychology, education, and media studies. Numerous studies suggest that extended exposure to television, particularly violent content, may contribute to aggressive behavior in children (Coyne & Stockdale, 2021; Nixon & Sargeant, 2022; Möller & Krahé, 2024; Freeman & Johnson, 2025).

Beyond television, children are increasingly exposed to digital technologies—such as computers and other screen-based media—for educational, entertainment, and social purposes (Tosun & Yılmaz, 2024; Freeman & Johnson, 2025). While the internet offers vast opportunities, it also presents risks, such as exposure to violent content, cyberbullying, and violent online games (Stewart & Moore, 2024; Wright & Perez, 2025). Among these, violent video games

have received particular attention. A substantial body of research, including meta-analyses, has linked violent gaming to increased aggression and reduced empathy (Stewart & Moore, 2024; Wright & Perez, 2025). Sibling relationships also play a crucial role in children's emotional and behavioral development. Sibling aggression, including physical, verbal, and emotional conflict, has been identified as a predictor of increased aggression in other social contexts, such as school or peer relationships (Smith & Hussmann, 2022; Horton & Cummings, 2024). Lansford, Criss, and Dodge (2021) found that children experiencing high levels of sibling conflict were more likely to display aggression toward peers.

Likewise, Bayer and Sawyer (2023) demonstrated that frequent sibling conflict correlates with long-term behavioral issues, including irritability and physical aggression. Nutrition is another critical factor influencing emotional regulation and behavior in children (Benton & Williams, 2021; Haines & McDonald, 2021; Martin & McGue, 2024; Strasser & Taylor, 2025). A healthy diet, rich in key nutrients, may help reduce aggression, while poor dietary patterns, such as high sugar and processed food intake, can exacerbate it (Parker & Butler, 2024). Although the exact mechanisms remain unclear, growing evidence supports the connection between diet and behavioral outcomes (Cohen & O'Reilly, 2022). Parenting styles are widely regarded as central to child development and behavior, including aggression (Padilla-Walker & Nelson, 2021; Baumrind & Black, 2021; Timmerman & Walton, 2022; Sikora & Wright, 2023; Chen & Lee, 2024; Steinberg & Silk, 2024; Foley & Jackson, 2025). Baumrind's (2021) and Maccoby and Martin's (2021) foundational work identified four primary parenting styles, authoritative, authoritarian, permissive, and neglectful, based on dimensions of demandingness and responsiveness. Different parenting styles have been linked to varying levels of aggression, with authoritative parenting generally associated with lower levels of aggressive behavior. (Timmerman & Walton, 2022; Sikora & Wright, 2023).

While individual factors such as gender, media use, and parenting have been widely studied, there is limited understanding of how these variables interact. Boys are generally more likely to exhibit aggression, and behaviors such as excessive television watching or violent game use have also been linked to higher aggression levels. Conversely, positive parenting and a healthy diet may buffer against these risks. Sibling dynamics and family context further shape behavioral development. There is a pressing need to understand how factors such as television viewing, computer use, sibling aggression, diet, and parenting styles collectively influence child aggression. While the effects of violent video games have been widely debated, research suggests that not all games have negative impacts. Parental involvement and social context may moderate these effects (Linder & Gentile, 2020). Similarly, the role of sibling aggression remains underexplored, particularly in relation to family dynamics and emotional regulation (Tully & Maughan, 2023). The connection between diet and aggression also requires deeper investigation, especially regarding specific nutrients and long-term dietary patterns (Taylor & Williams, 2023; Parker & Butler, 2024).

Furthermore, while parenting styles have been shown to affect aggression, the mediating and moderating factors, as parental warmth, consistency, and support, require further exploration (Lansford & Deater-Deckard, 2020; Grolnick & Pomerantz, 2023; Zhao & Yu, 2022). Each of these variables—media exposure, sibling aggression, diet, and parenting- has been identified as a potential contributor to child aggression. However, the mechanisms underlying these associations are not fully understood. Comprehensive research examining how these factors interact is needed to inform effective interventions. This study seeks to address the following research questions:

- What is the relationship between gender, television viewing, computer game use, sibling aggression, diet, parenting styles, and child aggression?
- What impact do parenting styles, sibling aggression, diet, media exposure, and computer use have on child aggression?

METHOD

A correlational research design was employed to collect quantitative data, based on the assumption that this approach offers a robust framework for examining relationships among multiple variables. The researcher selected this design because it effectively captures the complex interactions between environmental, behavioral, and demographic factors influencing child aggression. The target population comprised primary school children aged 7–12 years, drawn from 10 primary schools in the Eastern Hararghe Zone, Eastern Ethiopia. The sample size was determined using Taro's (1967) formula, appropriate for studies involving a well-defined population. Accordingly, the population size and formula application are as follows: $n_i = \frac{N_i}{1 + N_i(\alpha^2)}$ where N_i is the total number of population; n_i is the total sample size to be included; α is the sampling error with a value of .05. Therefore, the total sample size taken from the male population is 364, as indicated below.

$$n_i = \frac{N_i}{1 + N_i(\alpha^2)} = \frac{4000}{1 + 4000(0.05)^2} = \frac{4000}{1 + 4000(0.0025)} = \frac{4000}{1+10} = \frac{4000}{11} = 364.$$

Whereas the number of female participants that were taken from the 3750 populations was calculated from the same formula is:

$$n_i = \frac{N_i}{1 + N_i(\alpha^2)} = \frac{3750}{1 + 3750(0.05)^2} = \frac{3750}{1 + 375(0.0025)} = \frac{3750}{1 + 9.375} = \frac{3750}{10.375} = 361.$$ A total of 725 samples were collected from the entire population of 7,350 primary school children. Simple and stratified random sampling techniques were used in the research to obtain a sample that was both unbiased and accurately representative of the population's key characteristics. First, simple random sampling was applied to select primary schools from the total primary schools found in the zone thereby reducing selection bias and ensuring the fundamental fairness and randomness of the zone. However, because the population consisted of distinct subgroups that differed in characteristics relevant to the study, such as experiences, academic levels, gender groups, or institutional categories, the researcher further employed stratified random sampling. Stratification allowed him to divide the population into meaningful strata and then draw random samples from each subgroup proportionally. This ensured that no important subgroup was underrepresented or overrepresented, increased the precision of the estimates, and enhanced the generalizability and validity of the findings. Thus, the combination of simple and stratified random sampling was justified as it strengthened the representativeness, accuracy, and scientific rigor of the study.

A structured questionnaire was developed to systematically examine teachers' perceptions of the underlying causes of child aggression in primary schools in the Eastern Hararghe Zone. The instrument was based on a five-point Likert scale and underwent expert validation by educational psychologists and education specialists. These experts confirmed that the questionnaire items were highly valid and capable of generating the necessary data to address the research objectives. The questionnaire comprised two main sections. The first section gathered demographic information about the participants, including gender and professional background. The second section contained 87 items designed to capture teachers' perceptions of the underlying causes of aggressive behavior in children. Respondents rated each item on a five-point Likert scale: 1 = Strongly Disagree, 2 = Disagree, 3 = Undecided, 4 = Agree, and 5 = Strongly Agree.

To assess the reliability of the instrument, Cronbach's alpha coefficient was calculated. The overall reliability index was .95, indicating excellent internal consistency. Following the validation process, the researcher made minor adjustments to some technical terms and phrases that were deemed potentially difficult for the target respondents to understand. This refinement ensured greater clarity and accessibility without compromising the instrument's integrity. To establish the content validity of the instrument, five experts specializing in educational psychology, measurement, and assessment

were purposively selected based on their academic rank (Assistant Professor or above), publication record, and demonstrated experience in instrument development. Each expert independently reviewed the items for relevance, clarity, representativeness, and alignment with the intended constructs. Their ratings were analyzed using the Content Validity Index (CVI) at both the item and scale levels. The Item-Level CVI (I-CVI) was computed by dividing the number of experts who rated an item as relevant (ratings of 4 or 5 on a five-point scale) by the total number of experts, while the Scale-Level CVI (S-CVI) was calculated using both the average method (S-CVI/Ave) and the universal agreement method (S-CVI/UA). Consistent with accepted standards, items with I-CVI values of .80 or above were retained, items between .60 were revised, and items below .60 were considered for removal. The resulting S-CVI/Ave exceeded the recommended .90 thresholds, indicating strong overall agreement among experts and confirming that the instrument adequately captured the theoretical domains it was designed to measure. Together, these steps provided a robust evaluation of the instrument's content validity, clarity, and reliability before its final administration.

For data analysis, a combination of descriptive and inferential statistical techniques was employed through SPSS version 23. Bivariate correlation was used to explore the strength and direction of relationships among variables. The Enter method of multiple linear regression helped the researcher identify which variables most strongly predicted child aggression, while hierarchical regression was used to examine the incremental contribution of grouped predictors. These analytical tools provided a comprehensive understanding of the variables influencing child aggression, as perceived by teachers. Before conducting the regression analysis, the key statistical assumptions were examined to ensure the appropriateness of the model. Normality of residuals was checked using graphical methods such as histograms and normal probability plots. Linearity between the independent and dependent variables was assessed through scatterplots, while homoscedasticity was verified by inspecting the distribution of residuals across predicted values. Multicollinearity was evaluated using tolerance ($\geq$.1) and Variance Inflation Factor (VIF) ($\leq$ 10) values to confirm that predictor variables were not excessively correlated. All assumptions met the acceptable criteria, supporting the validity of the regression results. Moreover, before conducting the correlation analysis, the essential statistical assumptions were examined to ensure the validity of the results. The normality of the variables was checked using visual inspection of histograms and normal probability plots. Linearity between paired variables was assessed through scatterplots to confirm a straight-line relationship. In addition, the data were screened for outliers, which can distort correlation coefficients, using standardized scores and boxplots. All assumptions were found to be adequately met, supporting the appropriateness of using correlation analysis for the study.

Ethical approval for the study was obtained from the Institutional Review Board (IRB) of Haramaya University and East Hararghe Education Bureau, ensuring that all procedures complied with national and institutional research standards. Informed consent was secured from teachers, parents, and legal caregivers, and assent was obtained from the teachers participating in the study. Participants were assured that their involvement was voluntary, and all data were treated with strict confidentiality, using coded identifiers and secure data handling procedures to protect the privacy and well-being of the children throughout the research process.

RESULTS

Out of the 725 questionnaires distributed, a total of 665 were fully completed and returned, yielding a 91.73% response rate, a highly satisfactory figure for survey research. Among the respondents, 361 (49.79%) were female, and 364 (50.21%) were male, indicating a balanced gender distribution. The remaining 60 questionnaires were either incomplete (n = 40) or not returned (n = 20) and were excluded from the final analysis. The large, representative sample provided a strong basis for identifying and interpreting patterns related to the perceived causes of child aggression in the study area. The high response rate further strengthened the generalizability and credibility of the findings. The reliability of the instrument and the robust statistical methods employed allowed the researcher to draw data-driven insights into how teachers in Eastern Hararghe primary schools understand the roots

of aggressive behavior in children. This methodological approach is significant given the study's focus: understanding context-specific contributors to child aggression. By collecting data directly from teachers, who observe students' behavior firsthand, the study captures grounded perceptions shaped by lived experience. This has important implications for informing interventions, policy design, and teacher training programs aimed at mitigating aggression and promoting positive behavioral development in schools.

Table 1. Correlation matrices.

SN	Variables	1	2	3	4	5	6	7
1.	Gender	1	-.064	-.002	.044	.057	-.034	-.002
2.	Child Aggression		1	*.158***	*.186***	*.130***	*-.006*	*.209***
3.	Time spent watching TV			1	.166**	.228**	.97*	.527**
4.	Use of computer games				1	.225**	.244**	.214**
5.	Sibling aggression					1	.230**	.175**
6.	Balanced diet						1	.270**
7.	Parenting style							1

**. *P* < .01 (2-tailed).
*. P < .05 (2-tailed).

A Pearson correlation analysis was conducted to assess the relationship between the dependent variable, child aggression, and six independent variables: gender, time spent watching television, use of computer games, sibling aggression, balanced diet, and parenting styles. The analysis aimed to determine the extent to which each factor correlates with aggressive behaviors in children, as perceived by primary school teachers in the Eastern Hararghe Zone. The findings revealed that gender and a balanced diet were not significantly correlated with child aggression. Gender showed a weak negative correlation, $r_{(663)} = -.064$, $p > .05$, while a balanced diet exhibited a nearly zero correlation, $r_{(663)} = -.006$, $p > .05$, both results being statistically insignificant. These outcomes suggest that child aggression is not meaningfully influenced by gender differences or dietary patterns in the context of this study. Although biological and nutritional factors have been discussed in previous literature as influencing behavior, the current data imply that these elements are not primary predictors of aggression within the sampled population. As such, intervention strategies may require more context-specific, psychosocial, or environmental considerations rather than focusing on inherent or biological traits.

Conversely, four independent variables were found to be positively and significantly correlated with child aggression, indicating a measurable association between these factors and aggressive behavior: (i) Time spent watching television: $r_{(663)} = .158$, $p < .01$; (ii) Use of computer games: $r_{(663)} = .130$, $p < .01$; (iii) Sibling aggression: $r_{(663)} = .130$, $p < .01$, and (iv) Parenting styles: $r_{(663)} = .209$, $p < .01$. The positive and statistically significant correlation between time spent watching television and child aggression suggests that increased screen exposure, especially to potentially violent or unregulated content, may contribute to more aggressive behaviors. This supports existing research linking excessive television viewing to behavioral imitation, desensitization to violence, and impulsivity, reinforcing the need for media regulation and parental monitoring as part of school and home-based interventions.

In a similar vein, the correlation between the use of computer games and aggression indicates that children's interaction with digital games, particularly those involving violent content, may influence their behavioral tendencies. Although the correlation is modest, $r = .130$, the significance implies a consistent pattern that justifies media literacy programs and age-appropriate content control, especially within educational and parenting frameworks. The positive association between sibling aggression and child aggression, $r = .130$, also underscores the role of intra-familial dynamics. This finding aligns with social learning theory, which suggests that children may model aggressive behaviors observed or experienced in sibling interactions. This highlights the importance of fostering healthy sibling relationships and addressing conflict resolution within family environments. Of all variables, parenting styles showed the strongest correlation with child aggression, $r = .209$, indicating

that the nature of parenting, whether authoritative, authoritarian, permissive, or neglectful, plays a crucial role in shaping children's behavioral outcomes. This underscores the need for parent-focused interventions, particularly those that promote consistent, supportive, and non-coercive parenting strategies. Training programs, community-based parent education, and school collaboration with families could serve as key preventive measures.

The findings of this analysis reinforce the conclusion that environmental and psychosocial factors, especially those tied to family dynamics and media exposure, are more strongly associated with child aggression than biological or demographic factors such as gender and nutrition. This has practical implications for educators, psychologists, and policymakers working in the Eastern Hararghe Zone to effectively address aggression among primary school children, efforts should prioritize media supervision, parenting support, and conflict management in both home and school contexts. By identifying these key correlates of aggression, the study contributes to a more targeted and evidence-based understanding of the causes of child aggression, paving the way for more context-sensitive interventions in educational settings.

Table 2a. Model summary.

					Change Statistics				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.296[a]	.088	.080	.306	.088	10.568	6	658	.000

a. Predictors: (Constant), Parenting style, gender, Sibling aggression, Use of computer games, Balanced Diet, Time spent watching television.

A multiple linear regression analysis using the Enter method was conducted to examine the extent to which six independent variables, parenting style, gender, sibling aggression, use of computer games, balanced diet, and time spent watching television, predict child aggression. In this method, all predictors were entered into the model simultaneously to assess their combined effect on the dependent variable. The regression model was statistically significant, $F_{(6, 658)} = 10.568$, $p < .001$, and explained approximately 8.8% of the variance in child aggression, as indicated by $R^2 = .088$. Although the percentage of explained variance appears modest, this result is meaningful in behavioral research, where complex human behavior such as aggression, is influenced by a multitude of interacting factors. The significance of the overall model confirms that, together, the selected predictors contribute to explaining patterns of aggression among primary school children in the Eastern Hararghe Zone. This finding underscores the importance of addressing these environmental and psychosocial variables in both educational and family contexts. While the majority of variance in child aggression may stem from additional unmeasured factors, such as peer influence, trauma, or emotional regulation, the current model highlights that parenting practices, screen time, and sibling dynamics are measurable and modifiable contributors that merit targeted intervention. Thus, the regression model supports the broader aim of the study to identify key perceived causes of child aggression that can inform practical strategies for prevention and early intervention in schools and communities. Further research could build on this foundation by incorporating additional variables or using longitudinal designs to capture changes over time.

Table 2b. ANOVA result.

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5.954	6	.992	10.568	.000
	Residual	61.791	658	.094		
	Total	67.746	664			

a. Dependent Variable: Child aggression
b. Predictors: (Constant), Parenting style, Gender, Sibling aggression, Use of computer games, Balanced diet, Time spent watching television.

A multiple linear regression analysis was conducted to predict child aggression using six predictors: parenting style, gender, sibling aggression, use of computer games, balanced diet, and time spent watching television. All variables were entered simultaneously to assess their combined effect on

child aggression. The ANOVA results indicated that the regression model was statistically significant, $F_{(6, 658)} = 10.568$, $p < .001$, demonstrating that these predictors collectively explained a significant portion of the variation in child aggression. This finding suggests that the combined influence of family dynamics, media exposure, and individual characteristics plays a meaningful role in understanding aggressive behavior in children. It highlights the importance of considering multiple factors simultaneously when designing interventions aimed at reducing child aggression.

Table 2c. Coefficients.

		USDC		SDC			95.0% Confidence Interval for B		Collinearity Statistics	
Model		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	.039	.024		1.630	.104	-.008	.086		
	Gender	.000	.000	-.079	-2.113	.035	.000	.000	.992	1.008
	Watching TV	.032	.046	.031	.691	.490	-.058	.122	.696	1.437
	Computer games	.145	.037	.155	3.931	.000	.073	.217	.889	1.125
	Sibling aggression	.087	.039	.089	2.239	.025	.011	.163	.880	1.137
	Balanced diet	-.112	.038	-.118	-2.923	.004	-.187	-.037	.857	1.167
	Parenting style	.056	.015	.176	3.864	.000	.028	.085	.668	1.497

a. Dependent Variable: Child aggression

An Enter Method multiple regression analysis was conducted to predict child aggressive behavior based on six predictors: parenting style, gender, sibling aggression, use of computer games, balanced diet, and time spent watching television. All predictors were entered simultaneously to evaluate the overall model of the study. The model explained 8.8% of the variance in child aggression, $R^2 = .088$, $F_{(6, 658)} = 10.568$, $p < .001$, indicating that these variables collectively accounted for a statistically significant portion of the variation in aggressive behavior.

Examining the individual predictors, gender was a significant but negative predictor of child aggression ($B = .000$, $SE = .000$, $\beta = -.079$, $t_{(663)} = -2.113$, $p < .05$), suggesting that males and females differed modestly in aggression levels. Use of computer games significantly predicted higher child aggression ($B = .145$, $SE = .037$, $\beta = .155$, $t_{(663)} = 3.931$, $p < .001$), highlighting the influence of media exposure on aggressive behavior. Similarly, sibling aggression was a significant positive predictor ($B = .088$, $SE = .039$, $\beta = .089$, $t_{(663)} = 2.239$, $p < .05$), reinforcing the role of family dynamics in shaping aggression. Balanced diet emerged as a significant negative predictor ($B = -.112$, $SE = .038$, $\beta = -.118$, $t_{(663)} = -2.923$, $p < .05$), suggesting that healthier dietary habits are associated with reduced aggression. Parenting style also significantly predicted child aggression ($B = .056$, $SE = .015$, $\beta = .176$, $t_{(663)} = 3.864$, $p < .001$), confirming its important role in behavioral outcomes. Notably, time spent watching television was not a significant predictor ($B = .032$, $SE = .015$, $\beta = .031$, $t_{(663)} = .691$, $p > .05$), indicating that, within this model, TV viewing alone did not contribute meaningfully to aggression levels.

To address the second research question, hierarchical regression was applied. This method allowed for the sequential entry of variables based on theoretical rationale and their expected impact on child aggression. Gender was entered first to control for individual differences. Next, media exposure variables (television and computer games) and sibling aggression were added to account for environmental and social influences. Diet was entered subsequently to consider lifestyle factors. Finally, parenting styles were introduced to assess their moderating or mediating effects on the other variables. This approach enabled a nuanced understanding of each factor's unique contribution while controlling for the influence of others, offering a comprehensive view of the complex interplay between individual, familial, and environmental factors in predicting child aggression.

IOJPE
ISSN: 1300 – 915X
www.iojpe.org
International Online Journal of Primary Education 2025, volume 14, issue 4

Table 3a. Model summary on hierarchical regression analysis predicting child aggression.

					Change Statistics				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.064	.004	.003	.319	.004	2.684	1	663	.102
2	.170	.029	.026	.315	.025	17.060	1	662	.000
3	.237	.056	.052	.311	.027	19.054	1	661	.000
4	.247	.061	.055	.310	.005	3.435	1	660	.064
5	.259	.067	.060	.310	.006	4.278	1	659	.039
6	.296	.088	.080	.306	.021	14.928	1	658	.000

a. Predictors: (Constant), Gender
b. Predictors: (Constant), Gender, Time spent watching television.
c. Predictors: (Constant), Gender, Time spent watching television., Use of computer games.
d. Predictors: (Constant), Gender, Time spent watching television., Use of computer games, Sibling aggression
e. Predictors: (Constant), Gender, Time spent watching television., Use of Computer Games, Sibling Aggression, Balanced Diet
f. Predictors: (Constant), Gender, Time spent watching television., Use of computer games, Sibling aggression, Balanced diet, Parenting style.

To investigate the incremental effects of parenting style, sibling aggression, use of computer games, balanced diet, and time spent watching television on child aggression, hierarchical regression was employed. Gender was entered first as a control variable to account for its potential influence on the dependent variable, child aggression. Subsequently, the predictors of primary interest were added sequentially in the following order: time spent watching television, use of computer games, sibling aggression, balanced diet, and parenting styles. This approach allowed the researcher to clearly distinguish between the control variable and the main predictors, as previously explained. Specifically, Model 1 included gender alone, Model 2 added time spent watching television, Model 3 included the use of computer games, Model 4 added sibling aggression, Model 5 incorporated a balanced diet, and Model 6 introduced parenting styles.

Model 1 explained .4% of the variance in child aggression, $F_{(1, 663)} = 2.684$, $p > .05$ was a statistically insignificant predictor. That means gender did not significantly predict child aggression. After adding time spent watching television in Model 2, R^2 was increased by 2.5%, $F_{(2, 662)} = 9.905$, $p < .001$. It can be concluded that time spent watching television significantly predicted child aggression. After adding the fourth variable (sibling aggression) in Model 3, R^2 was increased by 2.7%, $F_{(3, 661)} = 13.135$, $p < .001$. It means that the use of computer games significantly predicts the child's aggression. After adding the use of computer games in Model 4, R^2 was increased by .5%, $F_{(4, 660)} = 10.746$, $p < .001$. Therefore, it can be concluded that sibling aggression can significantly predict child aggression. After adding the fifth variable (balanced diet) in Model 5, R^2 was increased by .6%, $F_{(5, 659)} = 9.495$, $p < .001$. Therefore, a balanced diet can significantly predict child aggression. The final model, including parenting styles (Model 6), explained 8.8% of the variance, $F_{(6, 658)} = 10.568$, $p < .001$. That is all six independent variables contributing 8.8% of the variance to the dependent variable (child aggressions).

Table 3b. ANOVA results.

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	5.954	6	.992	10.568	.000
Residual	61.791	658	.094		
Total	67.746	664			

a. Dependent Variable: Child aggression
b. Predictors: (Constant), gender
c. Predictors: (Constant), Gender, Time spent watching television.
d. Predictors: (Constant), Gender, Time spent watching television., Use of computer games
e. Predictors: (Constant), Gender, Time spent watching television., Use of computer games, sibling aggression
f. Predictors: (Constant), Gender, Time spent watching television., Use of computer games, Sibling aggression, Balanced diet
g. Predictors: (Constant), Gender, Time spent watching television., Use of computer games, Sibling aggression, Balanced diet, Parenting style

A hierarchical multiple linear regression was conducted to examine whether gender, time spent watching television, use of computer games, sibling aggression, balanced diet, and parenting style significantly predict children's aggressive behavior. The regression equation was significant, $F_{(1, 48)} = 23.45$, $p < .001$, indicating that these predictors reliably predict children's aggressive behavior. The model explained 8.8% of the variance in children's aggressive behavior ($R^2 = .088$).

Table 3c. Coefficients.

Model	Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B	
	B	Std. Error	Beta	t	Sig.	Lower	Upper
6 (Constant)	.039	.024		1.630	.104	-.008	.086
gender	.000	.000	-.079	-2.113	.035	.000	.000
Time spent watching television.	.032	.046	.031	.691	.490	-.058	.122
Computer Games	.145	.037	.155	3.931	.000	.073	.217
Sibling Aggression	.087	.039	.089	2.239	.025	.011	.163
Balanced Diet	-.112	.038	-.118	-2.923	.004	-.187	-.037
Parenting Style	.056	.015	.176	3.864	.000	.028	.085

a. Dependent Variable: Child Aggression

A hierarchical multiple linear regression analysis was conducted to examine the contributions of six predictors—gender, time spent watching television, use of computer games, sibling aggression, balanced diet, and parenting style- to the variance in child aggression. In Step 1, gender was entered into the model but did not significantly explain the variance in child aggression, $R^2 = .004$, $F_{(1, 663)} = 2.684$, $p > .05$. The unstandardized coefficient for gender was B = .000 (SE = .000), with a standardized coefficient $\beta = -.064$, $t_{(663)} = -1.638$, $p > .05$. In Step 2, time spent watching television was added, resulting in a significant increase in explained variance, $\Delta R^2 = .025$, $F_{(2, 662)} = 9.905$, $p < .001$. The coefficient for television time was B = .163 (SE = .039), $\beta = .158$, $t_{(663)} = 4.130$, $p < .001$, indicating that each unit increase in time spent watching television was associated with a .163-unit increase in child aggression.

Step 3 introduced the use of computer games, which also significantly improved the model, $\Delta R^2 = .027$, $F_{(3, 661)} = 13.135$, $p < .001$. The use of computer games had an unstandardized coefficient of B = .156 (SE = .036), $\beta = .167$, $t_{(663)} = 4.365$, $p < .001$, suggesting a positive relationship with child aggression. In Step 4, sibling aggression was added and significantly increased explained variance, $\Delta R^2 = .005$, $F_{(4, 660)} = 10.746$, $p < .001$. The unstandardized coefficient was B = .072 (SE = .073), $\beta = .167$, $t_{(663)} = 2.365$, $p < .001$, indicating sibling aggression positively predicted child aggression.

Step 5 included a balanced diet, which also contributed significantly, $\Delta R^2 = .006$, $F_{(5, 659)} = 9.945$, $p < .001$. The coefficient for balanced diet was B = -.078, SE = .038, $\beta = -.082$, $t_{(663)} = -2.068$, $p < .001$, suggesting that a healthier diet was associated with a reduction in child aggression. Finally, parenting style was added in Step 6, yielding a significant increase in variance explained, $\Delta R^2 = .021$, $F_{(6, 658)} = 10.568$, $p < .001$. Parenting style's unstandardized coefficient was B = .056 (SE = .015), $\beta = .076$, $t_{(663)} = 3.864$, $p < .001$, indicating a moderate positive effect on child aggression. Overall, the full model explained 8.8% of the variance in child aggression, highlighting that these factors, particularly media exposure, sibling dynamics, diet, and parenting, play significant roles in influencing aggressive behavior in children.

DISCUSSION, CONCLUSIONS, and RECOMMENDATIONS

The results of the present study demonstrated that gender was not significantly associated with levels of child aggression.. This aligns with some existing research, although the relationship between gender and aggressive behavior has been extensively studied and remains complex. Prior studies suggest that while general patterns exist, the nature and expression of aggression often vary by gender, influenced by both biological factors, such as hormonal differences and brain development, and social and cultural factors like gender roles and societal expectations (Anderson & Gentile, 2020; Bettencourt & Gross, 2020; Hubbard & Harten, 2021; Ferguson & Kilburn, 2022; Möller & Krahé,

2024). Consistent findings indicate that boys tend to express aggression overtly and physically, engaging in behaviors such as hitting or fighting, which are more visible and direct. Conversely, girls are more likely to exhibit relational or indirect aggression, including social exclusion, gossiping, or manipulating relationships, forms of aggression that are subtler and less overt (Coyne & Stockdale, 2021; Nixon & Sargeant, 2022; Olsson & Wester, 2024; Freeman & Johnson, 2025; Möller & Krahé, 2024). However, emerging research suggests this gender distinction may be less pronounced than previously believed, with girls also exhibiting physical aggression, particularly as they mature, albeit less frequently than boys.

Research between 2020 and 2025 increasingly emphasizes that boys and girls tend to manifest different forms of aggressive behavior**,** which shapes both how aggression is expressed and how it is observed or measured. For example, a large empirical study of older adolescents (aged 15–18) found that physical aggression was significantly more pronounced in males, whereas females more often exhibited hostility and anger-related aggression (Egorova, Rean, & Tichomandritskaya, 2024). At the same time, a recent systematic review noted that relational aggression, which includes social exclusion, rumor-spreading, and manipulation of peer relationships, is common across cultures, although patterns vary by context. Many studies still report that girls are more likely to use relational forms, while boys more often engage in physical aggression (Voulgaridou & Kokkinos, 2023). In line with these broader trends, it's plausible that in the current study, boys showed more overt or physical aggression, whereas girls may have exhibited more covert or relational aggression, behaviors that are harder to observe or may not be captured equally by measurement tools focused on physical aggression. This gender-linked divergence in the form, rather than the magnitude, of aggression situates the present findings within the established empirical literature and suggests that gender differences are expressed through aggression type rather than overall level.

The study also found that time spent watching television, use of computer games, sibling aggression, and parenting styles were positively and significantly correlated with child aggression. This is consistent with extensive literature linking excessive television viewing, particularly of violent content, to increased aggressive behaviors in children (Tosun & Yılmaz, 2024; Freeman & Johnson, 2025). However, this relationship is complex and often moderated by factors such as parental involvement, child temperament, and socio-environmental contexts. Interventions that enhance media literacy, encourage parental engagement, and promote emotional regulation have been identified as effective strategies to mitigate these effects (Tosun & Yılmaz, 2024; Freeman & Johnson, 2025). Similarly, the rise in computer and internet use among children has sparked concerns about its impact on behavior, including aggression. Research highlights both immediate and long-term effects of violent video games on children's aggressive thoughts and behaviors (DeCamp & Ferguson, 2020; Stewart & Moore, 2024; Wright & Perez, 2025). Short-term exposure may increase aggressive responses immediately following gameplay, while prolonged exposure can lead to desensitization to violence and normalization of aggressive behavior. Nevertheless, individual differences such as temperament, parental supervision, and the specific nature of game content critically influence these outcomes.

Sibling aggression also emerged as a significant correlate of child aggression. Literature confirms that sibling conflict can contribute to the development of aggressive behaviors, though this relationship is influenced by various moderators, including temperament, parenting practices, and the overall family environment (Bender & Schofield, 2020). Parenting styles were found to have a substantial impact on child aggression, echoing findings across numerous studies. Authoritarian, permissive, and neglectful parenting styles are generally linked to higher aggression levels, whereas authoritative parenting is associated with more adaptive behavioral outcomes (Padilla-Walker & Nelson, 2021; Maccoby & Martin, 2021; Timmerman & Walton, 2022; Steinberg & Silk, 2024; Chen & Lee, 2024). The influence of parenting styles on aggression is mediated through mechanisms such as emotional regulation, conflict resolution skills, and the quality of the parent-child relationship. Understanding

these dynamics is crucial for designing effective interventions that promote positive parenting and reduce aggressive behaviors in children (Baumrind & Black, 2021; Sikora & Wright, 2023; Foley & Jackson, 2025; Liu & Zhang, 2025).

Sibling aggression and parenting style likely play a pivotal role in shaping children's aggressive behavior, and this dynamic may help explain this study's results. For example, research shows that harsh or inconsistent parenting (authoritarian, indulgent, or neglectful styles) tends to increase sibling conflict and aggression, whereas an authoritative (warm, supportive) parenting style is generally protective against sibling aggression and peer-related aggressive behaviors (Liu & Abdul Rahman, 2022; Li, Shi, Zhang, et al., 2024). More specifically, a recent longitudinal study demonstrated that children exposed to aggressive or punitive parental discipline exhibited higher rates of peer-relation problems and emotional dysregulation, pathways that often mediate later aggressive behavior (Bedwell, Harrison, & Fridley et al., 2025). Moreover, sibling relational aggression itself is not only common within families but also associated with long-term social and cognitive outcomes, including poor decision-making and difficulties in social functioning in adulthood (Bedwell, Harrison, & Fridley et al., 2024). Considering this, if children in the sample grew up in homes characterized by harsh, neglectful, or inconsistent parenting, they may have experienced either physical or relational aggression with siblings, which, over time, could normalize aggression as a conflict-resolution strategy, influence emotional regulation, and thereby increase aggressive behavior more generally. Conversely, in homes where parents used supportive or authoritative parenting, children might develop empathy, better peer relationships, and lower aggression (Li, Zhou, Zhu, & Wu, 2023. Therefore, considering sibling aggression and parenting style provides a useful explanatory framework for why aggression levels might vary among participants, underscoring the importance of family environment, beyond peer, school, or individual factors, in interpreting our findings.

Conclusions

The current study concludes that gender is not a significant predictor of child aggression, suggesting that while boys and girls may express aggression differently, gender itself does not directly influence the overall frequency or intensity of aggressive behavior. Instead, the findings highlight that environmental and social factors play a more critical role in shaping child aggression. Notably, increased time spent watching television and engaging in computer games, higher levels of sibling aggression, and certain parenting styles are all strongly associated with elevated aggression in children. These results underscore the importance of focusing on the child's immediate environment and social context when addressing aggressive behavior, rather than relying on demographic factors like gender alone.

The implications of these findings are significant for parents, educators, and policymakers aiming to reduce aggression in children. Interventions should prioritize managing children's media consumption by encouraging limits on screen time and promoting age-appropriate, non-violent content. Furthermore, fostering positive sibling relationships and adopting authoritative parenting practices that emphasize emotional regulation and healthy communication may help mitigate aggressive tendencies. Additionally, the modest negative association between a balanced diet and aggression points to the potential benefits of holistic approaches that integrate lifestyle factors into behavioral interventions. Collectively, these insights advocate for multi-dimensional strategies that address both social environments and lifestyle habits to effectively reduce child aggression.

Recommendations

Based on these findings, interventions aiming to reduce child aggression should prioritize managing children's media consumption, particularly monitoring and regulating exposure to violent television content and video games. Parents and caregivers should be encouraged to foster positive sibling relationships and adopt authoritative parenting styles that promote emotional regulation and healthy conflict resolution. Schools and community programs could offer workshops on media literacy and parenting skills, helping families understand and mitigate the risk factors associated with child aggression. Additionally, promoting healthy lifestyle habits, including balanced nutrition, may serve

as a complementary strategy for reducing aggression in children. The study underscores the importance of a multifaceted approach to addressing child aggression, emphasizing that demographic factors like gender are less predictive than environmental influences. These results highlight the need for policymakers and practitioners to develop family-centered and community-based strategies that integrate media supervision, family dynamics, and parenting education. Understanding the complex interplay between these factors can inform tailored prevention and intervention programs that reduce aggressive behavior and support positive child development. Moreover, evidence highlighting the role of a balanced diet suggests that integrated physical and behavioral health strategies may produce additive benefits for children's behavioral outcomes..

Limitations and future research

While the study contributes valuable insights, limitations must be acknowledged. The cross-sectional design restricts causal inferences, and self-reported measures may be subject to bias. The study sample may also limit generalizability across different cultural or socioeconomic contexts. Future research should employ longitudinal designs to better understand causal pathways and examine how these factors interact over time. Besides, exploring other moderating variables, such as peer influence, mental health status, and community environment, would provide a more comprehensive understanding of child aggression. Investigating the mechanisms by which parenting styles and media exposure impact aggression could further refine intervention efforts.

Ethics and Conflict of Interest

The author declares that he acted in accordance with ethical rules in all processes of the research. The author declares no conflict of interest with other persons, institutions or organizations.

Corresponding Author

Correspondence to Gemechu Abera GOBENA, gemechu46@yahoo.com

REFERENCES

Anderson, C. A., & Gentile, D. A. (2020). Violent media and aggression: The impact of TV exposure to child aggression. In D. A. Gentile & J. P. Lee (Eds.), *Handbook of Children and the Media (2nd ed.*, pp. 327-341). Sage Publications.

Baumrind, D., & Black, M. (2021). Parenting styles and aggression in children: A developmental approach. *Developmental Review, 56*, 101409.

Bayer, J. K., & Sawyer, M. G. (2023). Sibling violence as a predictor of children's behavior problems and aggression. *Child Abuse & Neglect, 107*, 104679. https://doi.org/10.1016/j.chiabu.2020.104679.

Bedwell, S.A., Harrison, N., Fradley, S. et al. (2024). The role of sibling aggression during childhood in decision-making during adulthood. *Curr Psychol 43*, 2264–2276 (2024). https://doi.org/10.1007/s12144-023-04475-7

Bender, D. E., & Schofield, T. J. (2020). Sibling aggression and its impact on child aggression: Longitudinal and transactional analyses. *Developmental Psychology, 56*(5), 896-908. https://doi.org/10.1037/dev0000893.

Benton, D., & Williams, C. (2021). Dietary influences on aggression in children: An updated review. *Journal of Child Psychology and Psychiatry, 62*(10), 1161-1174.

Bettencourt, A. M., & Gross, A. M. (2020). The role of gender in the development of aggressive behavior in children. *Journal of Child Psychology and Psychiatry, 61*(5), 543-554.

Chen, Q., & Lee, S. Y. (2024). Authoritative vs. authoritarian parenting and its impact on children's aggressive behavior in adolescence. *International Journal of Behavioral Development, 48*(1), 72-83.

Cohen, J. E., & O'Reilly, A. (2022). Food, mood, and behavior: Investigating the link between nutrition and child aggression. *Journal of Pediatric Health, 58*(5), 739-747.

Coyne, S. M., & Stockdale, L. A. (2021). Television viewing and aggression in children: A meta-analytic review. *Journal of Youth and Adolescence, 50*(2), 268-285.

DeCamp, W., & Ferguson, C. J. (2020). Examining the effects of violent video games on aggression: A meta-analytic approach. *Journal of Youth and Adolescence, 49*(9), 1735-1748.

Egorova, A. V., Rean, A. A., & Tichomandritskaya, O. A. (2024). Gender and age-related peculiarities in manifestation of different aggression types in older adolescents. *Vestnik of Saint Petersburg University. Psychology, 14*(2), 205–222.

Foley, D. M., & Jackson, L. (2025). Parenting styles and externalizing behaviors in children: The mediating role of family dynamics and emotional reactivity. *Child Development, 95*(1), 95-111.

Ferguson, C. J., & Kilburn, J. (2022). The effects of television violence on child aggression: A critique of recent evidence. *Journal of Social and Clinical Psychology, 41*(1), 1-10.

Freeman, L., & Johnson, R. (2025). Aggression in children: Age and gender as predictors of behavioral outcomes in early childhood and adolescence. *Journal of Clinical Child and Adolescent Psychology, 54*(1), 121-131.

Grolnick, W. S., & Pomerantz, E. M. (2023). The influence of parenting on aggression in children: A systematic review and critique of recent studies. *Child Development Perspectives, 17*(2), 108-116.

Haines, J., & McDonald, J. (2021). The role of nutrition in childhood aggression and conduct problems: A systematic review of the literature. *Child Development Perspectives, 15*(2), 124-132.

Horton, K. E., & Cummings, E. M. (2024). Sibling conflict and its role in the development of children's aggression: Moderating effects of parental involvement. *Journal of Family Psychology, 38(*4), 471-485. https://doi.org/10.1037/fam0000598

Hernandez, L. E., & Robertson, L. (2023). The relationship between TV viewing and children's aggression: Longitudinal evidence from a national study. *Journal of Child Psychology and Psychiatry, 64*(5), 555-566.

Hubbard, J. A., & Harten, S. L. (2021). Gender differences in aggressive behavior among children: A meta-analytic review. *Psychological Bulletin, 147*(2), 134-149.

Klein, L. A., & Raine, A. (2025). The influence of sibling aggression on child development: A comprehensive review of recent literature. *Aggressive Behavior, 51*(1), 47-58. https://doi.org/10.1002/ab.21924.

Lansford, J. E., & Deater-Deckard, K. (2020). Parenting and child aggression: A longitudinal study of the effects of different parenting styles on aggression in early childhood. *Child Development, 91*(4), 1323-1336.

Li, Z., Zhou, Z., Zhu, L., & Wu, W. (2023). Parenting styles, empathy, and aggressive behavior in preschool children: A examination of mediating mechanisms. *Frontiers in Psychology, 14*. https://doi.org/10.3389/fpsyg.2023.1243623

Linder, J. R., & Gentile, D. A. (2020). The effects of violent video games on children's aggression: A longitudinal study. *Journal of Applied Developmental Psychology, 67*, 101089.

Liu, C., & Abdul Rahman, M. N. (2022). Relationships between parenting style and sibling conflicts: A meta-analysis. *Frontiers in Psychology*. https://doi.org/10.3389/fpsyg.2022.936253

Liu, X., & Wang, L. (2020). Dietary patterns and child behavior: A longitudinal study of the associations between diet and aggression in children. *Journal of Nutrition, 150*(4), 924-930.

Liu, Y., & Zhang, Y. (2025). Parental warmth, control, and aggression in children: Examining the role of parenting styles in shaping children's behavior. *Journal of Family Psychology, 39*(1), 66-75.

Maccoby, E. E., & Martin, J. A. (2021). The relationship between parenting styles and child aggression: Understanding the role of discipline strategies. *Developmental Psychology, 57*(8), 1230-1241.

Martin, J., & McGue, M. (2024). The impact of dietary patterns on behavioral and emotional regulation in children. *Journal of Clinical Child and Adolescent Psychology, 53*(2), 256-265.

Möller, I., & Krahé, B. (2024). Television and aggressive behavior in children: A meta-analytic study of the effects of watching TV on aggression. *Aggressive Behavior, 50*(3), 212-220.

Nixon, C., & Sargeant, J. (2022). Aggressive behavior in children and adolescents: The moderating role of gender and age. *Child and Adolescent Mental Health, 27*(4), 320-329.

Olsson, M., & Wester, T. (2024). Television viewing and the development of aggressive behavior in children: A longitudinal analysis. *Journal of Applied Developmental Psychology, 76*, 101338.

Padilla-Walker, L. M., & Nelson, L. J. (2021). Positive parenting and its effects on aggression in children: A longitudinal study. *Journal of Early Adolescence, 41*(3), 332-345.

Parker, G., & Butler, H. (2024). Behavioral effects of dietary patterns in children: Associations with aggression and mood disorders. *Pediatric Nutrition, 41*(4), 510-520.

Sikora, A. P., & Wright, L. E. (2023). Parenting styles and aggression in children: Moderating factors and developmental outcomes. *Journal of Family Psychology, 37*(4), 396-406.

Smith, M., & Huesmann, L. R. (2022). Aggressive interactions between siblings and their relationship to aggression in childhood and adolescence. *Child Development Perspectives, 16*(3), 170-176. https://doi.org/10.1111/cdep.12385

Steinberg, L., & Silk, J. S. (2024). Parental Monitoring and Control and Its Effect on Adolescents aggression: The role of parenting style and adolescent temperament. *Child Development, 95(*2), 303-318.

Strasser, M., & Taylor, D. (2025). Pro-inflammatory diets and childhood aggression: A new area of concern. *Clinical Pediatrics, 64(*2), 138-145.

Stewart, E. A., & Moore, M. (2024). The influence of gender and age on aggression: Exploring the role of socialization and developmental stages. *Psychology of Violence, 14*(2), 179-190.

Sykes, L. N., & Daniels, E. (2022). Micronutrient deficiencies and childhood aggression: Understanding the links. *Journal of Developmental and Behavioral Pediatrics, 43*(6), 432-439.

Timmerman, G., & Walton, P. (2022). Parental discipline styles and children's aggression: A meta-analytic review of intervention strategies. Parenting. *Science and Practice, 22*(4), 320-336.

Tosun, A., & Yılmaz, A. (2024). The link between TV watching and aggressive behavior in children: Evidence from a national survey of screen time use. *Child and Adolescent Mental Health, 29*(1), 55-63.

Tully, E. C., & Maughan, B. (2023). Examining the pathways between sibling aggression and child aggressive behavior: A meta-analytic review. *Journal of Child Psychology and Psychiatry, 64*(12), 1404-1417. https://doi.org/10.1111/jcpp.136000

Voulgaridou, I. & Kokkinos, C. M. (2023). Relational aggression in adolescents across different cultural contexts: A systematic review of the literature. *Adolescent research review, 8*(4), 457-480. https://doi.org/10.1007/s40894-023-00207-x

Wright, D., & Perez, M. (2025). Developmental perspectives on gender and aggression: A review of the impact of age-related changes on aggression in boys and girls. *Developmental Review, 49*, 100805.

Zhao, X., & Yu, W. (2022). Parenting styles and aggression in children: The role of parental emotional regulation and conflict resolution strategies. *Journal of Applied Developmental Psychology, 77*, 101333.

Zheng, Y., & Choi, E. (2023). Omega-3 supplementation and its effects on child aggression: A randomized controlled trial. *Journal of Child and Adolescent Psychopharmacology, 33*(9), 652-661.

About the Author:

Gemechu Abera Gobena

Gemechu Abera Gobena, an Associate Professor of Educational Psychology, is a doctoral student in Educational Psychology at Ethiopia, Haramaya University, College of Education and Behavioural Sciences, Department of Psychology. He teaches undergraduate and graduate courses at his home institution. His research interests include psychological testing, early childhood education, teaching–learning processes, assessment and evaluation of learning, psychological, social, and cognitive barriers to language development, classroom management, action research, teachers as reflective practitioners, psychological constructs, and the transfer of learning across early childhood, secondary, and tertiary education. His scholarly work examines how educational and psychological factors shape learner achievement across all levels of education in Ethiopia. He has authored more than 87 articles in reputable local, national, and international journals, published three book-chapter reviews in internationally recognized outlets, and completed over one hundred peer reviews for various publishers. He has also served his university in several leadership roles, including Dean, Associate Dean, Program Coordinator, and Associate Director of Deliverology Units, and has advised more than 200 postgraduates and 120 undergraduate students.

IOJPE

ISSN: 1300 – 915X
www.iojpe.org

International Online Journal of Primary Education *2025, volume 14, issue 4*

INSTRUCTIONAL STRATEGIES TO SUPPORT SECOND LANGUAGE LEARNERS IN DUTCH PRIMARY SCHOOLS

Richelle Dorotea SIJNSTRA
Utrecht University,
Faculty Member in Secondary Education and Specialist in Learning & Development, The Netherlands
ORCID: https://orcid.org/0009-0002-6360-308X
richellesijnstra@hotmail.com

Anna BEN SHALOM
Dr., Nyenrode Business University, The Netherlands
ORCID: https://orcid.org/0009-0000-5560-6892
a.benshalom@nyenrode.nl

Received: May 2, 2025 **Accepted:** December 2, 2025 **Published:** December 31, 2025

Suggested Citation:
Sijnstra, R. D., & Ben Shalom, A. (2025). Instructional strategies to support second language learners in Dutch primary schools. *International Online Journal of Primary Education (IOJPE), 14*(4), 182-210. https://doi.org/10.55020/iojpe.1689525

Abstract

Over time, the increase in multiculturalism has led to a culturally diverse society across Europe, which is reflected in Dutch primary educational classrooms. With the rise of diverse ethnic populations, schools have gained more second language learners (SLL). Insufficient language proficiency results in lower learning outcomes. Teachers face challenges and lack expertise on how to address these learning gaps. This case study examined what instructional strategies and materials primary school teachers use to support SLL in mainstream classrooms within a Dutch multicultural school context. Data were collected by conducting interviews and a focus group. The findings revealed that few strategies are put into practice due to teachers' lack of didactical expertise and training. Teaching programs should include lectures and activities to let future teachers expand their attitudes and increase teachers understanding of cultural perspectives on learning. Supporting SLL can be increased by incorporating Culturally Responsive Classroom Management (CRCM) practices and by educating teachers about trauma-sensitive teaching. Primary schools need to prioritize supporting multiculturalism by investigating the five dimensions for empowering multiculturalism in education. Hands-on tips for (future) teachers supporting SLL were collected and visualized.

Keywords: Multicultural education, second language learning, instructional strategies, trauma-sensitive teaching, culturally responsive teaching, classroom management.

INTRODUCTION

Multicultural context

Over time, the increase in multiculturalism has led to a culturally diverse society across Europe, which is reflected within Dutch primary education classrooms (Groothoff, 2020; Tielman et al., 2021; Van Tartwijk et al., 2009). In this study, multiculturalism is considered as the presence and recognition of diverse cultural and linguistic backgrounds among students in Dutch primary classrooms, and the educational practices that aim to support equity and inclusion (Banks & Banks, 2019). With the rise of diverse ethnic populations, schools have gained more second language learners (SLL) (Groothoff, 2020; Van der Borden & Lafleur, 2022). Second language learners (SLL) are children over the age of three who acquire a second language after their first language has been established (McLaughlin, 1977). Within the Netherlands, these SLL in school are known to be Dutch Second Language (DSL) learners. The Dutch translation for DSL is *Nederlands Tweede Taal* (NT2). An DSL student is defined as an individual who resides in a Dutch-speaking environment where Dutch is the primary language of interaction, yet the learner's native language differs and Dutch is acquired as an additional language (Kuiken & Andringa, 2022). Students attending

schools are provided with Dutch language lessons (Beekhoven et al., 2017). Besides SLL, there is another group that can be classified as newcomers. Newcomers are individuals who have recently arrived in the Netherlands and are at the initial stage of acquiring Dutch as a second language. They typically attend introductory programs, such as International Transition Classes (ISK), to develop linguistic and cultural competence before entering mainstream education (Kuiken & Andringa, 2022).

Structural challenges

However, for a few years, the Dutch government has been coping with teacher shortages in primary schools. In 2023, schools were given government funds to hire new employees, causing the teaching shortage to decrease from 9.6% to 8.1% (Adriaens, Elshout & Elshout, 2023). Even though there has been a decrease in the teacher shortage, the state secretary predicts that these shortages will increase again in two years (PO Raad, 17 December 2024). In primary schools with vulnerable and more complex populations, unfilled teaching positions are sometimes twice as high as in schools with less complex populations (Ministerie van Onderwijs, Cultuur en Wetenschap, 2023; NOS, 2024). As a result, the teacher shortage causes potential loss for less fortunate students (NOS, 2024). SLL are given the opportunity to follow Dutch language classes outside of the regular school program to increase their language competency. However, the number of children that need to attend is higher than the available places, which causes a waiting list (Lowan, 2022). Limited exposure to the Dutch language outside of school often results in minimal vocabulary, which hampers students from keeping up with the pace of regular classes (Scheele, 2010). The growing number of second language learners (SLL) in classrooms increases the need for differentiated instructional strategies that address linguistic diversity and support equitable learning opportunities

Pedagogical implications for SLL

To provide equal learning opportunities and to address this learning gap among students, teachers must be aware of cultural and linguistic challenges and have the expertise to address them (De Jong et al., 2013). Also, teachers should be educated on strategies for increasing language proficiency (Gibson, 2016). Weinstein et al., (2004) came up with the five elements of Culturally Responsive Classroom Management (CRCM) which can be applied within the classroom to enhance multiculturalism in education. However, studies show that teachers are not adequately prepared to teach students with different linguistic and cultural backgrounds and lack the right knowledge and support (Sarı & Yüce, 2020; Tielman et al., 2021; Tonbuloğlu et al., 2016). Therefore, this study explores the question: What instructional strategies and materials do primary school teachers use to support SLL in Dutch mainstream classrooms? The findings contribute to the theoretical field of teacher preparation for multicultural classrooms and teachers' use of instructional strategies for supporting SLL. In addition, this study provides insights into teachers' perspectives regarding teaching in multicultural classrooms, which can be used in teacher education programs (Tonbuloğlu et al., 2016). Lastly, this study provides practical tips for (future) teachers to support SLL in the classroom. The next section explains the concepts of multicultural classrooms and second language learning in primary education.

Multiculturalism in Primary Education

Multiculturalism is a concept defined by researchers in various ways (Bloemraad & Wright, 2014). This study focuses on multiculturalism from a demographic perspective, which entails the diversity of racial, ethnic, or religious backgrounds (Bloemraad & Wright, 2014) within the primary school context. *Multicultural education* could be described as schools that strive for "educational equity for a range of cultural, ethnic and income groups" (Banks & Banks, p. 6). Banks and Banks (2019) give five dimensions that a school can integrate to empower multicultural education: content integration, knowledge construction, equity pedagogy, prejudice reduction, and empowering school cultures. The dimensions for empowering multiculturalism in education can be addressed from various contextual levels, e.g., educational policies (macro), school vision (meso), or learning content and activities in the classroom

(micro) (Kaseorg & Uibu, 2017). This study explores the topic of multiculturalism at a micro level by looking at strategies and materials used by teachers in the classroom.

Multicultural classrooms

Multicultural classrooms are characterized by "a diversity of ethnicity, religion, mother tongue, and cultural traditions" (Van Tartwijk et al., 2009, p. 453). Multicultural primary classrooms expand due to educational policies (Gay, 1994) and increasing migration (Tielman et al., 2021). All students bring along their own cultures, languages, and experiences, which enhance students' positive behaviour, attitudes, and skills (Sarı & Yüce, 2020). Multiculturalism also supports students in gaining an understanding, recognition, and acceptance of different cultures (Abacioglu et al., 2019), which contributes to students' development of their social norms and identity (Kaufman & Killen, 2022). Costa (1997) states that the values and attitudes of the teacher determine how successful education is. Therefore, teachers should be aware of how cultural differences influence student relationships and how linguistic differences can strengthen and complicate students' academic abilities (De Jong et al., 2013). Students with different cultural and linguistic backgrounds can face challenges like social exclusion (Abacioglu et al., 2019), lack of motivation (Cerezo & Ato, 2010), or lower achievement (Walton & Cohen, 2007). To facilitate a culturally safe climate, teachers must know how to manage classrooms with cultural diversity (Taylor & Wendt, 2023).

Culturally responsive classroom management strategies

In the learning process, students are influenced by the teacher-student relationship and the school climate (Debbağ & Fidan, 2020). Since the demographics of student populations are changing, teachers need to be educated on how to apply the right classroom management strategies (Taylor & Wendt, 2023). Weinstein et al., (2004) came up with the five elements of Culturally Responsive Classroom Management (CRCM) which aim to identify a teacher's ability to reflect on their own culture related to others, learn about students' culture and backgrounds, understand sociopolitical and economic contexts, have the expertise and skills to implement culturally responsive practices and to create a caring classroom environment. However, van Tartwijk et al., (2009) state that beginning teachers in multicultural classrooms face challenges in creating a safe classroom environment. This issue must be addressed because teachers familiar with student backgrounds can align class activities, reducing discipline challenges and increasing the level of student motivation (Wyman & Kashatok, 2008).

Banks and Banks (2019) state that teachers learn about multiculturalism, but they do not receive enough examples to apply in their teaching. Furthermore, Sarı & Yüce (2020) found that teachers teaching students with different cultural backgrounds face challenges like a lack of expertise and time, and do not have a curriculum that provides them opportunities to teach in a multicultural way. In addition, Tonbuloğlu et al., (2016) argue for adapting multicultural educational principles within teacher programs, so teachers have opportunities to practice and develop these skills. Nevertheless, accurate recommendations of explicit skills or what teachers need to feel competent remain unclear.

Van Tartwijk et al., (2009) emphasize the importance of investigating which strategies are actually used by teachers in the classroom and recommend investigating how teachers incorporate student backgrounds within their classroom management. This study contributes to filling the literature gap on teachers' necessities for teaching in multicultural classrooms by providing recommendations for teacher programs on integrating multicultural classroom management. The next section explores how second languages influence student learning and which instructional strategies can be used by teachers to support SLL.

Second Language Learning

Students, after the age of three, who learn a second language after the first language has been established, are called second language learners (SLL) (McLaughlin, 1977). McLaughlin (1977) states that the ease with which young children learn second languages is most likely a result of exposure, motivation, and a

variety of social, psychological, and environmental factors. When looking at a child's cognitive development, in the period between birth and age three, the brain is prone to develop and retain new information (Ormrod, 2019). This means that second languages learned after the age of three are more challenging. When second languages are learned after seven, which is considered late, this could impact the grammatical processing (Newport et al., 2001). Therefore, offering SLL tailored support is crucial.
According to Vygotsky (1987), a second language can be learned through interaction with the social and environmental context, like school. Furthermore, language acquisition is influenced by individual factors (Pinter, 2011) like motivation or one's ability to learn (McLaughlin, 1977). Second language learning also depends on individual characteristics, internal and external characteristics (Groothoff, 2020). Groothoff (2020) explains that internal factors are e.g., structure of the first language, motivation, personality, age, and cognitive abilities), and external factors e.g., exposure to languages outside of school, parental input, or school support. Piaget argues that from the age of two, language becomes a reflection of a student's cognitive processes and that the level of language proficiency determines a student's further development (Tassoni, 2007). However, researchers found that these cognitive reflections also depend on prior knowledge and experiences (Ormrod, 2019). In addition, language comprehension and proficiency also depend on the student's home situation and parent involvement (National Institute for Literacy, 2008) and learners' socioeconomic status (Melby-Lervåg & Lervåg, 2014).

Dutch as a Second Language (DSL)

Students, with either an international or national identity, who learn Dutch as a second language are considered Dutch Second Language learners (DSL*)* (Harmsen & Altorf, 2023). The Dutch translation is for DSL is *Nederlands Tweede Taal* (NT2). An DSL student is defined as an individual who resides in a Dutch-speaking environment where Dutch is the primary language of interaction, yet the learner's native language differs and Dutch is acquired as an additional language (Kuiken & Andringa, 2022). DSL students have attended less than 6 years of Dutch national education. They are allowed to have more time during tests and use dictionaries but are also offered support by the school through, e.g., small group guidance (Harmsen & Altorf, 2023). Currently, DSL students and newcomers are placed within *schakelklassen*, a one-year bridging program, in which they are learning the basics of the Dutch language (Beekhoven et al., 2017; Kuiken & Andringa, 2022). After this year, students are enrolled in mainstream schools. Nevertheless, Nelemans et al., (2021) argue that DSL students are better off when being placed in regular classrooms right away and state that students usually require more than one year to fully learn the language and that DSL students benefit more from being surrounded by their peers, provided that the right support is offered. This statement aligns with the socio-cultural theory of Vygotsky (1987), who states that learning occurs through interaction with peers and their surroundings. Arguing from this point of view, SLL develop best when immediately being placed in interactive environments where they are surrounded by others. This is also in line with the monolingual perspectives of second language learning, widely used in Dutch schools. Such language learning models advocate for creating a monolingual learning environment in which the pupil is immersed in the second language (in this case, Dutch), excluding the home language as the language of instruction (Sierens & Van Avermaet, 2014). Monolingual perspectives to language learning argue that as first language learning happens naturally via immersion, the same learning process must apply for new language learning, assuming that language acquisition as a subconscious, automatic process is the most efficient when the pupil is exposed to the target language (Cummins, 2008). However, this perspective does not take into account the age difference between learning a first and a second language, nor the sociocultural context of pupils.

Second language learning in primary education

When children start going to school, they already know a thousand words and their phonological development is almost complete (Pinter, 2011). Phonological awareness, decoding, and language comprehension play an important role in vocabulary learning and literacy development (National Institute

for Literacy, 2008; Verhoeven et al., 2011). First-language learners increase their vocabulary by using strategies like bootstrapping or fast mapping to discover the meanings of unfamiliar words (Pinter, 2011). However, beginning SLL start with limited vocabulary, which makes it harder for them to understand learning tasks and texts (August et al., 2005; Snow & Kim, 2007; Van den Bosch et al., 2020; Vermeer, 2003). When second languages are not fully mastered by students, e.g., by limited vocabulary or difficulties in reading comprehension, learning outcomes are affected (August et al., 2005; Melby-Lervåg & Lervåg, 2014; Vermeer, 2003).

SLL support after the transition to mainstream classrooms

Transitioning can be defined as transferring students from special programs to mainstream classrooms (Lucas & Wagner, 1999). Determining student readiness for transitioning is difficult, therefore, Lucas and Wagner (1999) developed a framework for schools (Appendix 1). Their framework was created for secondary education, but it provides useful strategies for supporting the transition of SLL by carefully looking at student placement, professional development of teachers, teacher collaboration and communication, student support services, instruction that supports SLL, and hiring the correct staff. Furthermore, Brice and Perkins (1997) suggest that assessment of SLL before transitioning them to mainstream classrooms should include an ethnographic observation to see if the level corresponds with high-frequency behaviour.

To support SLL in mainstream classes, teachers must familiarize themselves with the linguistic background of their students (Pinter, 2011) and their cultural experiences (De Jong et al., 2013; Sarı & Yüce, 2020; Tonbuloğlu et al., 2016). Teachers should be well-prepared with knowledge and strategies (like creating small reading groups, using graphic organizers, and using blended learning) and have time to collaborate with other SL teachers to enhance their professionalism (Friedrichsens, 2020). De Jong et al. explain three dimensions that enhance a teacher's expertise in teaching SLL. First, teachers should know how first languages and second languages interact with each other. Secondly, they should know how to design lessons with the right amount of interaction, equal participation, and scaffolding. Thirdly, they should have the skills to manage and address contextual factors in the school surroundings and classrooms. In addition, Nam (2010) proposes the following activities to enhance vocabulary teaching: pictorial and written annotations, fill-in tasks, summarizing a text, post-reading composition tasks, reading and retelling a task, crossword puzzles, and matching exercises. Lastly, affective teaching practices, like supporting a safe classroom environment, and including cultural referents from students' home culture, contribute to effective teaching of SLL (Solórzano & Solórzano, 1999). Even though instructional strategies are mentioned in the literature, many recommendations are not specific enough, which requires more energy and complicates accessibility for teachers (Nassaji, 2012). Furthermore, few studies on instructional strategies for supporting SLL explicitly focus on primary schools.

Trauma-Sensitive Teaching

As some SLL come to the Netherlands as refugees, they might suffer from trauma (De Groot et al., 2023). Traumatic events influence children's health, and cognitive, emotional, and social development (Van Der Kolk, 2015; Osofsky et al., 2016). These experiences can affect their self-control and self-confidence, leading to potential behaviour issues in class (Clarkson Freeman, 2014; Dombo & Sabatino, 2019; Jennings, 2019). In addition, traumatic experiences also lead to lower concentration, memory, and language skills (Ogata, 2017), influencing school performance (Goodman et al., 2012). Traumatic events destroy the process of bonding, which affectsthe ability of students to develop (Jennings, 2019).

Jennings (2019), and Dombo and Sabatino (2019) stress the importance of providing a safe environment where children feel seen and respected by the teacher. Safe classrooms have clear expectations and routines, and triggers are limited. In addition, teachers can support students by exposing them to various types of relationship models, so students have another opportunity to restructure relationships. Furthermore, Blanton

et al. (2022) describe trauma-sensitive teaching practices according to six principles: (1) ensuring a safe classroom environment, (2) being trustworthy and transparent, (3) supporting peers, (4) practicing equal collaboration, (5) empowering individuals, and (6) acknowledging cultural, historical, and gender factors. Practicing these principles helps students who have experienced traumatic events to meet their full potential (Blanton et al., 2022). Teachers who gain knowledge about the effects of trauma will understand some of the fundamental causes of children misbehaving in the classroom (Honsinger & Brown, 2019).

Present Study

Research has shown that SLL are still underperforming compared to their peers (Cadelle Hemphill et al., 2011), and the achievement gap between students continues to grow (Devia, 2019; Kennisrotonde, 2020). There is a literature gap on teacher preparation for multicultural classrooms and specific recommendations of instructional strategies for supporting SLL in primary schools. This study investigated (1) teacher needs for teaching within multicultural classrooms, and (2) aimed to provide useful insights to implement within teacher education programs (Tonbuloğlu et al., 2016). Furthermore, (3) it contributed to the theoretical field of supportive teaching strategies for SLL in mainstream primary classrooms by examining which strategies are used in practice compared to what is suggested in the literature. Lastly, since prior studies lack clarity in providing applicable tips for the classroom, this study (4) aimed to provide clear, accessible, hands-on tips for teachers. that can be easily implemented by assessing teachers' needs, by answering the main research question of this study is: What instructional strategies and materials do primary school teachers use to support SLL in mainstream classrooms? This question was explored by looking at the following sub-questions:

- How were teachers trained to teach within multicultural classrooms?
- What challenges do teachers face when teaching in multicultural classrooms?

The second sub-question was added after the data analysis phase to bridge the gap between multicultural classrooms and teaching SLL by looking at classroom management strategies. When revisiting the literature, the challenges mentioned were categorised under the umbrella of CRCM.

METHOD

As this study was conducted within one specific school setting, a case study was chosen as a research design. This case study can be categorized as an ordinary instrumental case study because the situation is typical, the phenomenon occurs widely, and the findings of this study can be generalized and applied in other similar settings (Creswell, 2007). A case study method was chosen because it aimed to gain in-depth insight into one particular topic (Heale & Twycross, 2017) and it was bound by a specific time and place (Creswell, 2009). Furthermore, this study aimed to gain a deeper understanding by including multiple perspectives (Ritchie et al., 2014) of the head of school and SL (second language) teachers by conducting semi-structured interviews and by asking teachers in focus group discussions. A case study allows multiple types of data collection, with specific focus on one school and exploring a phenomenon within the school's context (Creswell, 2009; Ritchie et al., 2014). Given the time frame in which this study was conducted only one school was selected. To enhance the quality of the study, the focus of the research was further refined to address the specific needs of this school. Another reason why this school was selected was because of the representativity of the aim of this study because of the high school weight. In Dutch primary education system, school weighting is an indicator of the complexity of the student population, based on socio-economic and cultural factors, and reflects the associated risk of educational disadvantage. The scale is from 20 till 40, where 30 is the average number. The school in this study had a high school weight (38.15-38.51 across recent years) (School director, personal communication, December 2, 2025). Lastly, an interpretive thematic analysis was used to provide participants the opportunity to share their experiences while respecting the context (Ritchie et al., 2014).

Participants

The study was conducted within a Dutch primary school with a multiculturally diverse population. The school was situated in the Netherlands in a deprived area where the socio-economic status of the parents is low. The student population is very diverse of cultures and has 132 students. At the school, there were 11 classroom teachers, five teaching assistants, one internal support coordinator, one administrative assistant, and one school director. In the DSL lessons, there were two teachers and two teaching assistants. To gain as much rich information to answer the research question (Jones et al., 2014), the participants were selected based on a purposive sampling method (Ritchie et al., 2014). All participants were formally recruited via mail through the contact person at the school. The demographics of the participants of the focus group can be found in Table 1.

Table 1. Demographics of the participants.

Participant	Years of teaching experience	Years of teaching experience with SLL	Pseudonym
School director	20	0	Eva
SLL teacher 1	8	7.5	Lotte
SLL teacher 2	9	7	Femke
Teacher 1	4	0	Lisa
Teacher 2	5	0	Lars
Teacher 3	1.5	0	Julia
Teacher 4	18	1	Sophie
Teacher 5	45	3	Annet
Teacher 6	9	1.5	Sanne

Instrumentation

The data collection consisted of conducting semi-structured interviews and a focus group. Based on the guidelines of Ritchie et al., (2014) and Boeije (2014), the aim was to set up a focus group with six to eight teachers. In the end, six teachers participated. The participants for the focus group were chosen using a purposive sampling strategy (Ritchie et al., 2014). The day the focus group was conducted took place on the day that most teachers were present. This ensured that both lower and upper classes in the school were represented. The focus group was organized within the staff room and lasted around 60 minutes. In addition, three interviews were conducted: two with DSL teachers and one with the school director. The interviews took place within the teachers' classroom and the director's office at the end of the school day and lasted around the estimated time. The questions and topics for the focus group were created by the author based on the teaching strategies recommended by the literature.

Pilot Study

Before data collection, both the interview guidelines and focus group questions were piloted with two peers. Some interview questions were adjusted for clarity. For the focus group, the decision was made to use an interactive form preventing the feeling of a group interview and to giving each participant a turn to speak. Furthermore, this gave me as a researcher the opportunity to ask follow-up questions and to monitor the conversation.

Procedure

After the necessary ethical approvals were obtained at the university, an information letter was sent to all staff members at the school to inform them about the research project. The letter explained the aim of the study and the research objectives. Before participation, informed consent was obtained to protect the

participants' rights. The interviews and the focus group were conducted face-to-face after the schooldays within a month. The questions asked in the interviews and the focus group are available upon request.

Quality standards

To enhance credibility, member checks were done by sending each participant the transcript of the interview or focus group to check correct interpretation (Guba and Lincoln, 1994). Furthermore, triangulation of data approaches was used to study the case from multiple perspectives. Interviews serve well to explore topics in-depth and allow participants to share their perspectives and experiences, whereas focus groups are suitable for exploring group norms and (non-) expressed ideas (Boeije, 2014; Ritchie et al., 2014). Triangulation of data sources also helps to crystallize findings by using independent measures and reducing biases (Jonsen & Jehn, 2009). The interview with the school director and the focus group were used to complement each other as both parties are in the same school, but they have a different function, which provides information from different perspectives. The interviews with the DSL teachers were used to find similarities and differences in classroom management strategies. Last, informal observations were done in the school to learn about the context and to earn trust.

To enhance transferability, a rich description of the case was included within this study so the findings could be generalized to other settings (Creswell, 2009). A purposeful sampling strategy was used to gain in-depth insights in different perspectives of both classroom and SL-teachers on the same topics within the school (Peterson, 2019). To enhance the dependability, a detailed audit trail of the steps taken was included based on the steps of Akkerman et al. (2008) as the findings are time-bound and influenced by external factors. The audit trail is available upon request. For enhancing confirmability, multiple data collection methods were used (Peterson, 2019) and a reflexive journal was kept being aware of interpretations (Creswell, 2009).

Positionality

This study was conducted following Guba and Lincoln's principles of trustworthiness (1994) in line with the constructivist approach. Throughout this study, I closely worked with one contact person and the participants within the school. Acknowledging my position as a white woman and being a primary school teacher myself, I was aware that these prior experiences influenced my assumptions and biases in my role as a researcher. However, by writing memos and keeping a research journal, I reflected on my assumptions and decisions. In addition, I attended peer round-table sessions and met with senior researchers to discuss possible issues. These meetings also helped me stay aware of my own assumptions and reflect on blind spots.

Ethics

To protect the confidentiality and privacy of research participants, all data were anonymized by using pseudonyms. Personal information was kept separate from research data, and access to identifiable information was restricted to the researcher. Furthermore, participation was voluntary, and all participants were provided with detailed information about the research, including its purpose, procedures, potential risks, and benefits. Informed consent was obtained from each participant before participation in the study. Furthermore, participants were able to withdraw from the study at any time.

Data Analysis

The interviews and focus group were audio recorded and transcribed before data analysis. Thematic analysis (TA) was used following the steps of Braun and Clarke (2006). A substantive and inductive approach was used, focusing on what the text said and aimed to develop labels and categories for answering the research question. TA requires exploring, interpreting, and reporting patterns, and based on that, ideas are clustered (Ritchie et al, 2014). First, each transcript was carefully read (step 1), and initial codes and themes were created (step 2 and 3) using the software program NVivo. Then, the themes were reviewed and redefined

(step 4 and 5) and the final themes were used for reporting the findings (step 6). An example of how this was done is shown in Table 2. TA is a flexible approach that can be used to summarize key features from a large data set (Braun & Clarke, 2006). To prevent poor analysis, the 15-point checklist was used to enhance the quality (Appendix 2) (Braun & Clarke, 2006).

Table 2. Visualisation of the thematic analysis process.

Step		Description	Example
1.	Familiarize yourself with your data	Transcribing, reading, and re-reading the data, noting down initial ideas.	*I have no idea how to do that either, but I know how to deal with SLL children socially, how to create a safe environment, and what is nice for a child. I can say that I would be competent in that, but learning and teaching them something is difficult. (Lisa)*
2.	Generating initial codes	Systematically coding interesting features across the entire data set, collating data relevant to each code.	Various of these examples lead to the combined theme: Teachers don't know how to support SLL in the right way.
3.	Searching for themes	Collating codes into potential themes, gathering all data relevant to each potential theme.	After data revision, it became clear that it could be explained as the 'lack of didactical skills to support SLL'.
4.	Reviewing themes	Checking if the themes work in relation to the coded extracts and the entire data set.	The theme was refined as: 'Lack didactical expertise for accommodating the right support'.
5.	Defining and naming themes	Ongoing analysis to refine the specifics of each theme, and the overall story the analysis tells, generating clear definitions and names for each theme.	After reviewing, the theme 'Lack didactical expertise for accommodating right support' and 'Limited time and access to material/resources' were combined to 'Poor accessibility to support teachers teaching SLL'.
6.	Producing the report	Selection of examples, final analysis of selected extracts, relating the analysis back to the research question and literature.	The final theme was used to describe the finding.

RESULTS

When analysing the data, the following five themes emerged: *teacher readiness, poor accessibility to support teachers teaching SLL, the need for facilitation of collaboration and knowledge sharing,* and *challenging external factors*. One of the external factors, trauma-sensitive teaching, was one of the key findings related to SLL support. Therefore, it was added to the literature review after data analysis. Even though TA was used for the analysis, the Gioia Methodology (Magnani & Gioia, 2023) was used for clear visualisation of the conceptualization of the themes (Figure 1). This methodology uses a structured approach to develop theoretical concepts from single-case studies (Gioai, 2021).

IOJPE
ISSN: 1300 – 915X
www.iojpe.org
International Online Journal of Primary Education 2025, volume 14, issue 4

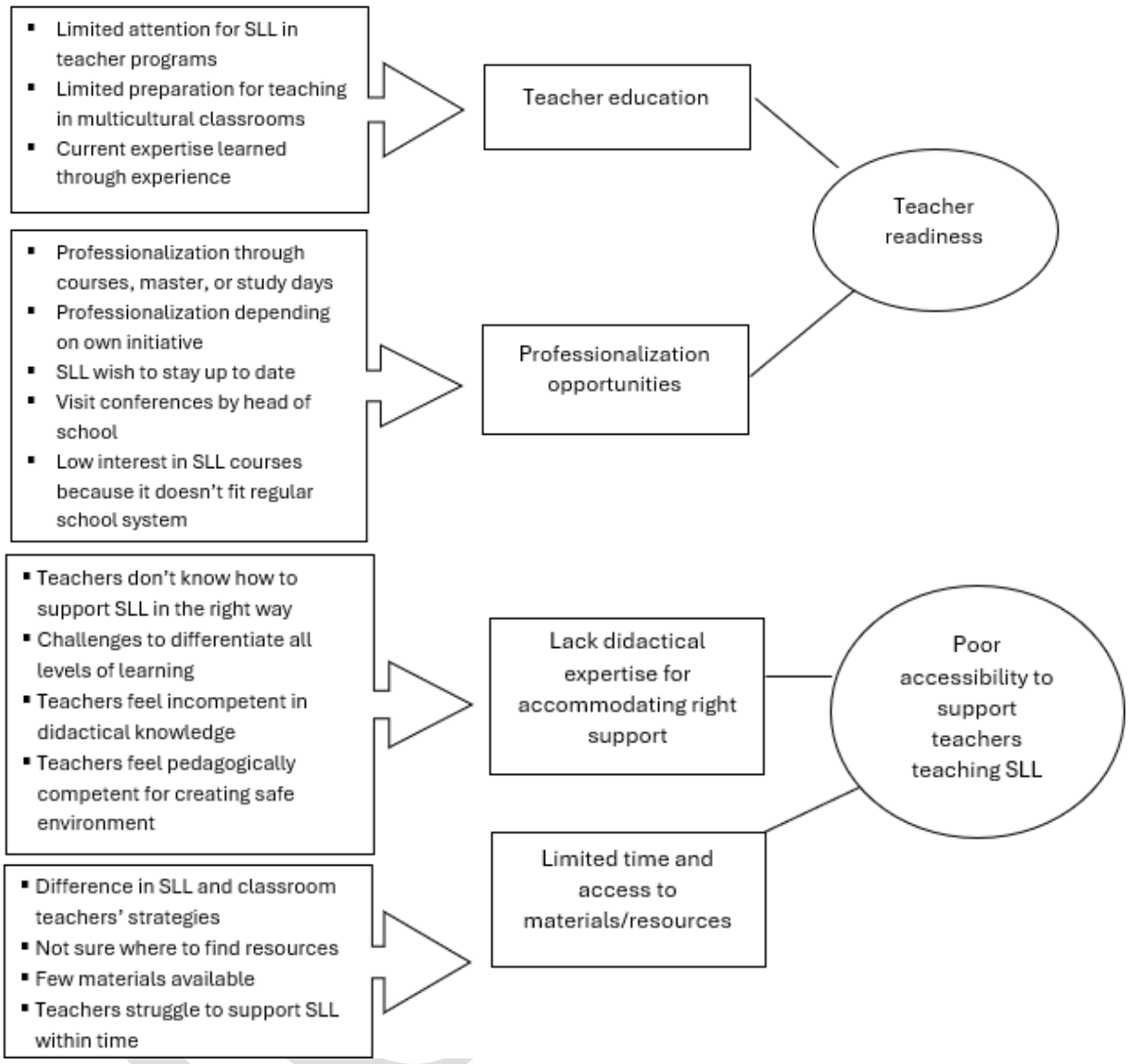


Figure 1. Conceptualisation of themes by the Gioia Methodology.

IOJPE
ISSN: 1300 – 915X
www.iojpe.org
International Online Journal of Primary Education 2025, volume 14, issue 4

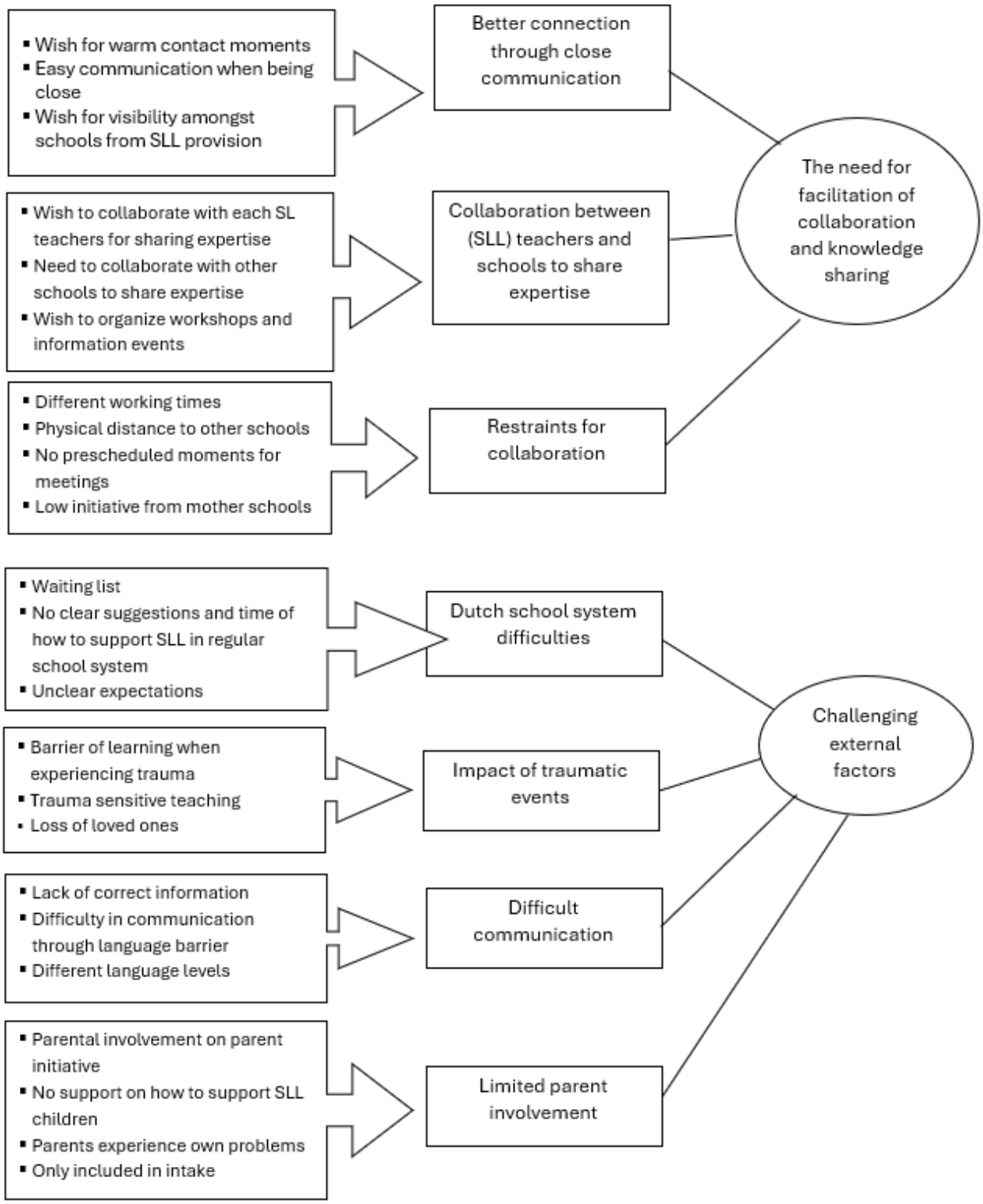


Figure 1 (Continued). Conceptualisation of themes by the Gioia Methodology.

In addition to the Goia model, the following figure was created to show the connections between the three concepts: multicultural pedagogical competence, the didactical competence and trauma-sensitivity (Figure 2). The figure illustrates the intersection across three domains (multicultural pedagogy, didactics, and trauma-sensitivity) indicating that sufficient expertise has the potential to significantly enhance learning outcomes for second language learners (SLL) in primary education.

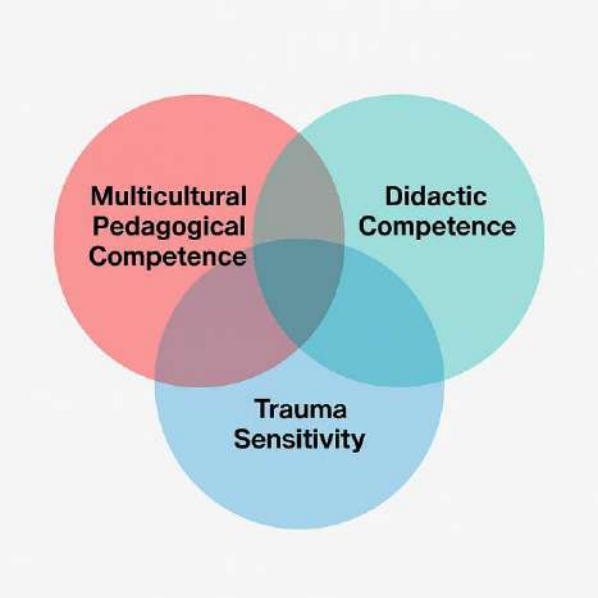


Figure 2. Conceptualisation of themes.

Teacher Readiness

Teacher education

When looking at the participants' educational background, none of the classroom teachers had a former education relevant for teaching SLL students. Their current expertise was learned through experience. The teachers shared that their prior education taught them about different religions and difficult parental situations, but not how to support SLL or cultural differences. Teachers stated that these subjects aimed at learning how to teach a certain subject rather than how to act appropriately to challenges. Furthermore, a lot of emphasis and encouragement within the teaching programs is aimed at fulfilling internships in special needs education, but there is hardly any promotion for SLL. The SL teachers obtained their SLL certification in addition to their prior teaching degrees, but only after a few years of teaching.

Professionalization opportunities

When teachers were asked about the opportunities for further professionalization, various options were mentioned, like doing a master's, following additional courses, or observing each other's classes. Nevertheless, even though various possibilities existed, not many teachers seemed to use these opportunities. The most mentioned reason was that attending SLL courses offered teachers interesting and useful insights, but within the current school system and classroom setup, it was impossible to apply them.

> In the SLL courses, you see what you cannot apply yourself, so we need something that fits within the regular school system... because otherwise you see all kinds of beautiful ideas there and then you think yes, nice! But it cannot be applied to your lesson. (Lisa).

The SL teachers have various options to develop themselves further. They use study days to discuss relevant topics or visit conferences like the Lowan-days or bring up their own ideas. “All new developments and visions and what will be added in that area? Yes, we want that too.” (Lotte). Also, the school director attends conferences to educate herself but is not satisfied with her level of expertise. She stated that other schools within the school organization do not have the expertise either, which makes it difficult to share knowledge. Looking at both aspects of teacher readiness, it seems that what has been taught in teaching programs is not sufficient, and the professionalization opportunities for teachers are there, but depend on the initiative of the school and teachers. In addition, the teachers mentioned that even though they would attend courses, the information shared there cannot be applied in regular classrooms.

Poor Accessibility to Support Teachers Teaching SLL

Lack of didactical expertise for accommodating tailored support

Effective support for SLL starts with teachers who have the right expertise to address challenges (De Jong et al., 2013). When teachers were asked about instructional strategies, the majority found it hard to specify what they used. Teachers mentioned that they used a lot of different vocabulary, aimed at having the same expectations towards students, and adjusted assignments where needed by e.g., finding similar tasks without too much text. However, adjusting the assignment was not done based on strategies, but more on student inclusion within the group. Hand gestures or the newcomer's method from Jose Schraven were used. However, despite these actions, most teachers reported that they were not aware of specific strategies.

When looking at teachers’ feelings of competence towards supporting SLL, they rated themselves according to two categories. For the pedagogical aspect, teachers found themselves competent and felt like they were able to create a safe learning environment and ways to guide students within the class. Teachers ensured a safe learning environment by following a set structure throughout the day, making sure the students felt welcomed, and connecting them to a peer. Cultural references were not purposefully used by teachers but mostly occurred through students' initiatives such as small talk during break time. One teacher admitted she found it difficult to ask students questions about their culture:

> Sometimes I find it difficult to ask students related to their culture because I don't really know what their background is or whether I’m provoking unpleasant memories for them. Just take the example of Ukraine or something like that... I'm deliberately not going to ask about that, but if they start talking about it themselves or if I ask, well, what are you going to do on the weekend? And they say something like... then you show interest, and I think it's really nice. (Sophie)

Nevertheless, for the didactical aspect, teachers reported that they had a hard time figuring out the didactical ways to teach them. One teacher rated themselves a three out of ten, whereas another teacher added:

> I have no idea how to do that either, but I do know how to deal with SLL children socially, how to create a safe environment, and what it is nice for a child. I can say that I feel competent in that, but learning and teaching them something is difficult. (Lisa)

Teachers shared that they did not know how to facilitate lessons that accommodate learning for each of their students. Nevertheless, Sanne, who has a few years of experience with SLL, pointed out the following: **“**For me it's different. I worked at such a SLL school, so yes, I feel quite capable in that regard. However, you really have to organize your education accordingly”. This statement emphasizes the importance of proper facilitation by schools and teachers.

Also, the SL teachers both reported not being fully aware of what strategies they were using. Nevertheless, both SL teachers followed a fixed structure throughout their daily schedule, which facilitated easy adaptation for new students who come in throughout the year. Furthermore, the SL teachers mentioned various didactical strategies: Viertak van Verhallen, a strategy used for teaching vocabulary, Wereld Vol Woorde, Logo 3000, newcomers’ strategies from Jose Schraven for vocabulary learning and spelling,

Veilig Leren Lezen, Letter Stad, and Total Physical Response (TPR), a didactical approach for language learning. In addition, the SL teachers shared different work forms that they used such as own-level learning, cooperation tasks, working in circuits, pairing up of students, drama lessons, games, drawing examples on the iPad or laptop, circle time, reading time, auditive tasks, and using hand gestures. The differences in teaching strategies could be explained by their prior education and the teaching context: smaller classes, provision of teaching assistants, and focus on language learning.

Limited time and access to materials

When looking at supporting materials, classroom teachers mentioned they had access to books in various languages: Chromebooks, visual dictionaries, and picture books. Others mainly used Google pictures to explain and visualize concepts. However, materials for children to work with were: "Not a lot" (Sanne) and "Nothing at all" (Lisa), "I have no materials…The higher the grade, the less we have..." (Lars). However, Sanne, who worked with SLL students before, felt more equipped because she used materials from her prior workplace such as number cards and useful websites for student materials andalso for herself, by using a scheme indicating students' expectations. Materials that were mentioned by the SL teachers were letter cards, laptops, memory games, mini-library, audiobooks, visual reminders on the table, pictures, 'praatplaten', textless books, and IOPN (individual development plan for newcomers).

Through these findings mentioned above, we concluded that both classroom teachers and SL teachers feel competent enough in accommodating a pedagogically safe environment to support SLL. However, didactical expertise and strategies that can be used to support SLL students are recognized more in SLL classes than in regular classrooms. The applicability of (didactical) strategies within the Dutch educational system was pointed out as a critical note. Based on the responses of classroom teachers and SL teachers, one point for improvement addresses the accessibility of materials for supporting SLL learners, especially in upper grades, where students who have just entered after the SLL provision may need it the most.

The Need for Facilitation Collaboration and Knowledge Sharing

Collaboration between (SLL) teachers and schools to share expertise

During the interview, participants were asked about the possibilities of collaborating. The school director mentioned that she saw enough time for the classroom teachers and SL teachers to collaborate since both are situated in the same building. She also emphasized that support from the SLL provision is helpful since access to the expertise in SLL within their school and schools within the surrounding area is limited. Also, teachers with SLL degrees are rare. The classroom teachers felt the freedom to walk over to the SLL provision whenever they faced difficulties or had questions. The SL teachers also felt the communication with the school went smoothly.

Restraints for collaboration

Even though the physical distance was short, teachers expressed their wish to see the SL teachers and missed the personal contact moments. "They have their own coffee room" (Lars), and classroom teachers mentioned that the working hours of the SLL are different, which makes it sometimes harder to find moments to talk to them. "Yes, they only work until 14:00, of course, which is inconvenient, you just miss each other after school" (Lisa).

Furthermore, the SL teachers also acknowledge the convenience of working in the same building and explained that the official communication moments with other schools are three to four times a year in written form. Both SL teachers feel that it differs per situation whether they would like to have additional communication with schools or not. Additional appointments are made on a casual basis. Other contact moments between schools and the SLL provision are facilitated by the internal support coordinators from each school. SL teachers would like to have an annual moment for school coordinators and teachers to answer questions.

Facilitating factors for collaboration

To enhance collaboration, the SL teachers expressed their wish to be seen more so that teachers from other schools would feel free to approach them whenever they encountered problems. The classroom teachers found that the close connection made it easier for them to ask for help. However, one of the teachers correctly mentioned that they were lucky to be this close, but when the SLL provision in the future gets its own school, solutions need to be created to maintain this connection. Even more for schools that are not located within the same building as the SLL provision. One teacher pointed out:

> We have a lot of luxury in that we can discuss everything easily, and the lines of communication are short. However, it is often specifically about a child who is in your class and their class... then it is often about behaviour that you encounter and which you can discuss. Perhaps we could make even more use of the other knowledge… (Lars).

Furthermore, the SL teachers stated that they felt unseen and expressed their wish for more publicity of the work they do and to become more visible to be approachable to other teachers: "For the warm contact, to become visible yourself, but also because I think that knowledge is sometimes lacking" (Femke). To summarize, the findings of this theme pointed out that there is a wish to collaborate, but the facilitation of these moments is still rare and occasional. Few moments are set, which means that collaboration depends on own initiative.

External Challenges

Dutch school system difficulties.

Students depend on available placements for starting with SLL provision, which causes a waiting list. SL teachers report that nearly 80-90% of the students should be ready after one year, but some students need more time. Due to this, classroom teachers accept students in their class who lack the basic skills of the Dutch language. In addition, the Dutch school system does not offer opportunities, guidance, or time on how to support SLL within regular classes. This adds another challenge to teaching SLL because classroom teachers need to figure out how to include them in the class while teaching the other students on their level.

Trauma

Another challenge that arose during the data collection was trauma. One SLL teacher caught her student scrolling through Google Maps rather than completing language activities. The teacher asked the student:

> Why don't you do spelling? But she was looking for her home in Syria. I realised, your thoughts are over there. Your mind is completely out of focus…Writing a -t or a -d... Why would you care about that? You are concerned with whether your house is still there or not. So, then as a teacher, you should also respond to that, I think. (Femke).

This example highlights that teachers teaching SLL need to have strong pedagogical skills to support these students. The school director also added that teachers who work at their school are chosen based on their high level of pedagogical skills. While teachers talked about their feelings of competence in accommodating a safe and welcoming learning climate, they expressed their concerns during the focus group teachers about teaching traumatized students and wished to know more about trauma-sensitive teaching and its impact on learning.

Difficult communication and lack of information

When students enrol in school, an intake is planned to establish the students' current home situation and assess the students' learning needs. Nevertheless, quite often there is a lack of information because students did not attend school before their enrolment here in the Netherlands, or they did not attend school at all. Other factors that complicate communication are language barriers or missing information due to unshared information due to shame or safety concerns. With limited information, teachers struggle to assess where

to start or to place certain behaviour. Femke states: “Sometimes I do not know whether it is trauma or autism”.

Parental involvement

As described by Lucas and Wagner (1999), parental involvement is an important factor in supporting SLL. From the findings, it appeared that parents were only present at the intake sessions at the beginning of student enrolment. After that, parents were informed throughout parent meetings. For the SL teachers, interaction with parents depends on the parents themselves, since there are no pre-scheduled moments besides the information letters. The SL teachers encourage parents to register their children to participate in a sport or after-school club to be surrounded by Dutch speakers, but it is difficult to ask and expect a lot from parents when they also have to deal with their own problems.

DISCUSSION, CONCLUSION, and RECOMMENDATIONS

This study aimed to answer three questions. First, this research investigated how teachers in mainstream primary classrooms support SLL using instructional strategies and materials. Even though many strategies are proposed in the literature, few teachers could name them. However, some strategies, like using visuals and books or adjusting the assignment to the learner’s level, could be deduced from teachers’ answers. When looking back at the framework of Lucas and Wagner (1999), only a few requirements for the effective transitioning of SLL were met. For instance, the framework proposes to place students based on prior information and assessments. However, the findings indicated that accurate information is not always available for all SLL. Furthermore, the parent involvement in SLL was low, and little additional support for SLL was offered after transitioning by the school. Moreover, teachers had limited knowledge about the materials that were there to support them in teaching SLL. On the contrary, SL teachers were more aware of and used the available supportive materials, which indicates that there are materials available, but that classroom teachers and schools are not familiar with them. By teaching future teachers these didactic skills, such as being able to assess the student’s level based on learning activities and adjust a learning plan accordingly, and frameworks, the next generation of teachers should be more equipped to support SLL.

Secondly, this study also explored how these teachers were trained to cope with culturally diverse classrooms. Teachers were competent in creating safe classroom environments but expressed the challenges of providing students within mainstream classrooms with the right support while still serving the non-SLL. The findings revealed that teachers lack adequate preparation in their teacher education programs regarding multiculturalism, which aligns with earlier mentioned literature (Sarı & Yüce, 2020; Tieleman et al., 2021; Tonbuloğlu et al., 2016). Even though including multicultural referents within teaching is recommended by the literature, the participants did not seem to realize the impact of including cultural referents on learning. De Jong et al., (2013) emphasize how cultural differences can complicate, but also strengthen academic achievement. The teachers repeatedly demonstrated awareness ofthe cultural differences of their students, but the teachers only stressed how linguistic differences can complicate academic achievement. Primary schools are encouraged to investigate the five dimensions that could be applied to their specific school situations for empowering multicultural education (Banks & Banks, 2019).

Both findings related to instructional strategies and materials and culturally appropriate teaching styles could be placed under the five elements of CRCM (Weinstein et al., 2004). It could be concluded that two elements are currently addressed by teachers: having the desire to employ culturally responsive practices and being able to create a loving classroom environment. For the other three elements, teachers still seem to lack the skills for culturally responsive management practices and an understanding of their importance. Teachers should be educated with classroom management skills to create a safe learning environment that stimulates students’ achievement and success (Mahmoodi et al., 2015; Tonbuloğlu et al., 2016) by learning

about CRCM strategies and knowing where to find supportive material like the IOPN[1]. In addition, primary school management should facilitate materials that can be used by students and teachers to enhance students' learning. By raising more awareness about culturally responsive teaching and by providing strategies that can be used, like including pictures or stories from students' home countries, students feel more included, which stimulates a safe learning environment and leads to better learning (Solórzano & Solórzano, 1999).

The third question investigated the challenges experienced by teachers when teaching in multicultural classrooms. Both SL teachers and classroom teachers expressed the wish to collaborate with different stakeholders within school communities, but the occasions are rare. To bridge the gap between expertise in SLL, schools, and SLL provisions must find ways to collaborate. With an increasing SLL rate in primary classrooms, heads of schools are encouraged to seek out SL teachers or communities and facilitate meetings to expand teacher expertise and experience. The content of multicultural education is not included in the curricula (Debbag & Fidan, 2020). Teacher education programs should include lectures or activities that allow future teachers entering the teaching profession to develop their attitudes and understanding (Debagg & Fidan, 2020). Trauma-sensitive teaching was another challenge that was addressed in this study. As described in the literature, traumatic events impact students' learning and ability to develop (Van Der Kolk, 2015; Osofsky et al., 2016). Providing a safe environment and support can help students. Teachers need to be educated to recognize these signs of trauma so that they can adjust their behaviour and teaching strategies accordingly. Teachers should know how to make students feel at ease, what to do and what to avoid, and how to support these students in their learning process (Jennings, 2019).

Although extensive research has been conducted on strategies to support second language learners (SLL), much of this literature remains theoretical or focuses on international contexts. There is a notable gap regarding the practical implementation of these strategies within Dutch primary schools. This study addressed that gap by examining how teachers in the Netherlands apply instructional strategies for second language learning in everyday classroom practice. Findings indicate that, beyond instructional approaches, teachers' expertise in trauma-sensitive practices, culturally responsive classroom management (CRCM), and multicultural pedagogical approaches also plays a critical role in enhancing learning outcomes for SLL. This highlights the need for integrated teacher education programs that combine these domains to effectively support linguistic and socio-emotional development.

Implications for Practice

This study investigated what instructional strategies were used by teachers to support SLL as recommended by van Tartwijk et al. (2009) by answering the research question: "What instructional strategies and materials do primary school teachers use to support SLL in mainstream classrooms?". It could be concluded that teachers do not purposefully choose strategies and materials to support SLL. In addition, supporting SLL can be increased by incorporating CRCM strategies and by educating teachers about trauma-sensitive teaching. However, teachers are not familiar with CRCM strategies for creating a culturally safe environment and face challenges related to trauma-sensitive teaching. There is also limited collaboration with topic experts. To comply with the needs of teachers regarding multicultural classrooms, teacher education programs, and primary schools need to prioritize supporting multiculturalism by using a variety of cultural examples in their lessons, increasing teacher understanding of how learning is influenced by cultural perspectives and biases, and pedagogy (Banks & Banks, 2019; Solórzano & Solórzano, 1999).

Furthermore, this study found that even though strategies are mentioned in the literature, few are applied in practice within schools due to teachers' lack of didactical expertise and insufficient training or support. Therefore, teacher education programs are advised to encourage internships within schools that have SLL

[1] IOPN: Individueel ontwikkelplan nieuwkomers

or create a minor. In addition, lectures or activities should be included in the curricula to let future teachers expand their attitude and understanding of multicultural classroom management (Debbag & Fidan, 2020). Hands-on tips for creating a culturally responsive classroom environment and materials collected through data and literature were explained and visualized (Appendix 3). The visual was written in Dutch informal language, so it can be used by apprentice or junior teachers within the Netherlands to support SLL. Lastly, primary school teachers and SLL provision institutes are encouraged to speak up and become more visible to share and expand knowledge, while primary school organizations are encouraged to reach out for collaboration so expertise can be shared across schools.

Limitations

The first limitation of this study is that the SLL provision was in the same building as the primary school but was seen as a separate organization. Officially, it is not seen as a part of the school. When looking at other schools within this area, the expertise of teachers might be different since there is no such close link. In addition, some of the answers given by the SL teachers were aimed at multiple schools, like communication. Therefore, the data obtained from the SL teachers was not always fully about the case study's school, but about multiple schools within the area.

A second limitation is that this case study included perspectives from the school director, SL teachers, and classroom teachers. However, the frequency of how many times something was mentioned was not possible to include in Figure 2, because teachers completed each other while speaking. It was difficult to pinpoint exactly what each teacher used or had in their/his classroom and to distinguish information per group or generalize the findings to other schools. Future studies are encouraged to facilitate multiple focus groups or conduct separate interviews to strengthen findings.

Future Recommendations

Contextual Factors

Future studies should examine schools where SLL lessons are not available to determine which teaching strategies are implemented without the support of SL teachers. This could reveal whether classroom teachers adapt their practices differently when they cannot rely on specialized language support. Additionally, conducting similar research in more privileged areas may provide valuable insights into how socioeconomic context influences language learning strategies, teacher expectations, and student outcomes.

Pedagogical Practices

Further research is needed on the integration of multicultural education and trauma-sensitive practices in primary schools. These approaches are essential for creating inclusive learning environments, particularly for students from diverse cultural and linguistic backgrounds. Studies could explore how teachers incorporate cultural referents into their lessons and how trauma-informed strategies impact student engagement and well-being. Moreover, investigating scaffolding techniques for multilingual learners and examining socio-linguistic variation between mono- and multilingual children would deepen understanding of effective instructional practices.

Teacher Development

Teacher education and professional development should be a key focus of future research. Studies could investigate how training programs prepare teachers to address cultural diversity and trauma-sensitive approaches in the classroom. Research might also explore the effectiveness of ongoing professional learning initiatives and how school leadership can support teachers in implementing inclusive strategies. Developing evidence-based guidelines for teacher training in these areas would contribute significantly to improving educational equity.

Student Perspectives

Finally, future research should prioritize the voices and experiences of minority students. Understanding their challenges, perceptions of inclusion, and educational needs can inform policies and practices that promote equity and belonging. Qualitative studies, such as interviews or participatory research, could provide rich insights into how these students navigate language learning and cultural integration within the school system.

Ethics and Conflict of Interest

This research was conducted in accordance with recognized ethical standards. Ethical approval was obtained from the relevant institutional review board. All participants provided informed consent prior to participation. The author declares that he acted in accordance with ethical rules in all processes of the research. The authors declare that there are no conflicts of interest related to this work.

Author Contribution

All authors contributed equally to the research.

Data availability

The data that support the findings of this study are available on request from the corresponding author.

Corresponding Author

Correspondence to Richelle Dorotea SIJNSTRA, richellesijnstra@hotmail.com

REFERENCES

Abacioglu, C. S., Isvoranu, A., Verkuyten, M., Thijs, J., & Epskamp, S. (2019). Exploring multicultural classroom dynamics: A network analysis. *Journal of School Psychology*, *74*, 90–105. https://doi.org/10.1016/j.jsp.2019.02.003

Adriaens, H., Elshout, M. & Elshout, S. (2023). *Personeelstekorten primair onderwijs – peilingsdatum 1 oktober2024*. Tilburg: Centerdata. https://open.overheid.nl/documenten/dpc-e895aa23dd903dabd590d2dc9bfe0c11b45b2a9d/pdf

Akkerman, S., Admiraal, W., & Brekelmans, M. (2008) Auditing quality of research in social sciences. *Qual Quant*, 42, 257-274. https://doi-org.proxy.library.uu.nl/10.1007/s11135-006-9044-4

August, D., Carlo, M., Dressler, C., & Snow, C. (2005). The critical role of vocabulary development for English language learners. *Learning Disabilities Research & Practice*, *20*, 50–57. https://doi.org/10.1111/j.1540-5826.2005.00120.x

Banks, J. A., & Banks, C. A. M. (2019). *Multicultural education: Issues and Perspectives*. John Wiley & Sons.

Beekhoven, S., Hoogeveen, K., Kruiter, J., & Van der Heyden, K. (2017). *Schakelklassen, zomerscholen en onderwijstijdverlenging.* Sardes.

Blanton, M. A., Richie, F. J., & Langhinrichsen-Rohling, J. (2022). Readiness to change: A pathway to the adoption of trauma-sensitive teaching. *Behavioral Sciences*, *12*(11), 445. https://doi.org/10.3390/bs12110445

Bloemraad, I., & Wright, M. (2014). Utter failure or unity out of diversity? Debating and evaluating policies of multiculturalism. *The International Migration Review/International Migration Review*, *48*, 292–334. https://doi.org/10.1111/imre.12135

Boeije, H. R. (2014). *Analysis in qualitative research*. SAGE.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, *3*(2), 77–101. https://doi.org/10.1191/1478088706qp063oa

Brice, A. E., & Perkins, C. O. (1997). What is required for transition from the ESL classroom to the general education classroom? A case study of two classrooms. *Journal of Children's Communication Development*, *19*(1), 13–22. https://doi.org/10.1177/152574019701900103

Cadelle Hemphill, F., Vanneman, A., & Rahman, T. (2011). Achievement gaps: How Hispanic and White students in public schools perform in mathematics and reading on the national assessment of educational progress. Statistical Analysis Report. *National Center for Education Statistics.*

Cerezo, F., & Ato, M. (2010). Social status, gender, classroom climate and bullying among adolescents pupils. *Anales de Psicologia*, *26*(1), 137–144. 10.6018/92131

Clarkson Freeman, P. A. (2014). Prevalence and relationship between adverse childhood experiences and child behavior among children. *Infant mental Health Journal*, *35*(6), 544-554. 10.1002/imhj.21460

Costa, X. B., (1997). *Intercultural education: Theories, policies and practices*. Ashgate.

Creswell, J. W. (2007). *Qualitative inquiry and research design: Choosing among five approaches.* SAGE Publications, Incorporated.

Creswell, J. W. (2009). *Research design: Qualitative, quantitative, and mixed methods approaches*. SAGE Publications, Incorporated.

Cummins, J. (2008). *Teaching for transfer: Challenging the two solitudes assumption in bilingual education*. In: N. H. Hornberger (Ed.), Encyclopedia of language and education (pp. 1528-1538). Springer, Boston, MA. https://doi.org/10.1007/978-0-387-30424-3_116

Debbağ, M., & Fidan, M. (2020). Relationships between prospective teachers' multicultural education attitudes and classroom management styles. *International Journal of Progressive Education*, *16*(2), 111–122. https://doi.org/10.29329/ijpe.2020.241.8

Devia, L. M. (2019). *Administrators' Perceptions of Transitioning Second Language Learners into the Mainstream Classroom.* Texas A&M University-Kingsville.

De Jong, E. J., Harper, C., & Coady, M. R. (2013). Enhanced knowledge and skills for elementary mainstream teachers of English language learners. *Theory Into Practice*, *52*(2), 89–97. https://doi.org/10.1080/00405841.2013.770326

Dombo, E. A., & Sabatino, C. A. (2019). Trauma care in schools: Creating safe environments for Students with adverse childhood experiences. *American Educator, 43*(2), 18-21. https://eric.ed.gov/?id=EJ1218781

Friedrichsen, A. (2020). *Second language acquisition theories and what it means for teacher instruction.* (Master's thesis, Northwestern College, Iowa, USA). Retrieved on December 27, 2023, from https://nwcommons.nwciowa.edu/cgi/viewcontent.cgi?article=1200&context=education_masters

Gay, G. (1994). *A synthesis of scholarship in multicultural education.* Urban Monograph Series.

Gibson, C. (2016). Bridging English language learner achievement gaps through effective vocabulary development strategies. *English Language Teaching*, *9*(9), 134. https://doi.org/10.5539/elt.v9n9p134

Gioia, D. (2021). A Systematic Methodology for Doing Qualitative Research. *The Journal of Applied Behavioral Science*, *57*(1), 20-29. https://doi.org/10.1177/0021886320982715

Goodman, R. D., Miller, M. D., & West-Olatunji, C. A. (2012). Traumatic stress, socioeconomic status, and academic achievement among primary school students. *Psychological Trauma*, *4*(3), 252–259. https://doi.org/10.1037/a0024912

Groothoff, F. C. (2020). Second language development of newly arrived migrant kindergarteners: Exploring educational settings and pedagogical practices in the Netherlands. Utrecht University.

De Groot, I., Leijgraaf, M., & Van Dalen, A. (2023). Towards culturally responsive and bonding-oriented teacher education. *Teaching And Teacher Education*, *121*, 103953. https://doi.org/10.1016/j.tate.2022.103953

Guba, E. G., & Lincoln, Y. S. (1994). Competing paradigms in qualitative research. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of qualitative research* (pp. 105–117). Sage Publications, Inc.

Harmsen, A. & Altorf, R. (2023). *Protocol NT2-leerlingen (Nederlands als tweede taal)*. UGO verkennend VMBO. https://www.udo.nl/media/default/UGO-Protocol-NT2-2023-2024.pdf

Heale, R., & Twycross, A. (2017). What is a case study? *Evidence-Based Nursing*, *21*(1), 7–8. https://doi.org/10.1136/eb-2017-102845

Honsinger, C. & Hendricks, M. H. (2019). Preparing trauma-sensitive teachers: Strategies for teacher educators. *Teacher Educators' Journal*, *12*. 129-152. https://eric.ed.gov/?id=EJ1209431

Jennings, P. A. (2019). Teaching in a Trauma-Sensitive Classroom: What Educators Can Do to Support Students. *American Educator*, *43*(2). American Federation of Teachers, AFL-CIO. 12-17.

Jones S. R., Torres V., Arminio J. (2014). *Negotiating the complexities of qualitative research in higher education: Fundamental elements and issues* (2nd ed.). Routledge.

Jonsen, K., & Jehn, K. A. (2009). Using triangulation to validate themes in qualitative studies. *Qualitative Research in Organizations and Management: An International Journal*, *4*(2), 123–150. https://doi.org/10.1108/17465640910978391

Kaufman, E. M., & Killen, M. (2022). Children's perspectives on fairness and inclusivity in the classroom. *The Spanish Journal of Psychology*, *25*(28). https://doi.org/10.1017/SJP.2022.24

Kaseorg, M. & Uibu, K. (2017). Teachers' understandings about education decision-making processes on macro, meso and micro level. *New Trends and Issues Proceedings on Humanities and Social Sciences.* [Online]. 4(6), 169-177. Available from: www.prosoc.eu

Kennisrotonde. (2020). *Is starten in een aparte taalklas voor instromende NT2-leerlingen in het basisonderwijs beter voor de taalontwikkeling in het Nederlands? En is duidelijk hoe lang de leerlingen het beste in een aparte taalklas kunnen verblijven?* (KR.835). Den Haag: Kennisrotonde.

Kuiken, F., & Andringa, S. (2022). *Handboek Nederlands als tweede taal in het volwassenenonderwijs*. Uitgeverij Coutinho.

Lowan. (2022). *Inventarisatie instroom nieuwkomers in het basisonderwijs (4-12 jaar)*. Lowan ondersteuning onderwijs nieuwkomers. https://www.lowan.nl/wp-content/uploads/2022/11/Rapportage-korte-vragenlijst-wachtlijst-PO.pdf

Lucas, T., & Wagner, S. (1999). Facilitating secondary English Language Learners' transition into the Mainstream. *TESOL Journal*, *8*(4), 6-13.

Magnani, G., & Gioia, D. (2023). Using the Gioia Methodology in international business and entrepreneurship research. *International Business Review*, *32*(2), 102097. https://doi.org/10.1016/j.ibusrev.2022.102097

Mahmoodi, M. H., Izadi, N., & Dehghannezhad, M. (2015). An investigation into the relationship among EFL teachers' reflection, classroom management orientations, and perceptions of language learning strategies and students' L2 achievement. *Applied Research of English Language*, *4*(2), 25-42. 10.22108/ARE.2015.15501

McLaughlin, B. (1977). Second-language learning in children. *Psychological Bulletin*, *84*(3), 438-459. https://10.1037/0033-2909.84.3.438

Ministerie van Onderwijs, Cultuur en Wetenschap (2023). Trendrapportage arbeidsmarkt leraren PO, VO en MBO 2023. Den Haag, The Netherlands: Rijksoverheid. https://open.overheid.nl/documenten/dpc-0e4e96ef530d5ff8dbad7e46c38c34c33ae9040e/pdf

Melby-Lervåg, M., & Lervåg, A. (2014). Reading comprehension and its underlying components in second-language learners: A meta-analysis of studies comparing first- and second-language learners. *Psychological Bulletin*, *140*(2), 409–433. https://doi.org/10.1037/a0033890

Nam, J. (2010). Linking research and practice: Effective strategies for teaching vocabulary in the ESL classroom. *TESL Canada Journal*, *28*(1), 127. https://doi.org/10.18806/tesl.v28i1.1064

Nassaji, H. (2012). The Relationship between SLA research and language Pedagogy: Teachers' Perspectives. *Language Teaching Research*, *16*(3), 337–365. https://doi.org/10.1177/1362168812436903

National Institute for Literacy. (2008). *Developing early literacy: A scientific analysis of early literacy development and implications for intervention*. Retrieved from http://www.nifl.gov/publications/pdf/ NELPReport09.pdf

Nelemans, S., Muller, P., & Beekhoven, S. (2021). *Is een aparte taalklas voor instromende NT2-leerlingen in het basisonderwijs beter voor de taalontwikkeling in het Nederlands?* Kennisrotonde. Retrieved on December 19, 2023, from https://wij-leren.nl/taalklas-nt2-leerlingen-bo-taalontwikkeling-nederlands.php

Newport, E. L., Bavelier, D., & Neville, H. J. (2001). Critical thinking about critical periods: Perspectives on a critical period for language acquisition. In E. Dupoux (Ed.), *Language, brain, and cognitive development: Essays in honor of Jacques Mehler* (pp. 481–502). The MIT Press.

NOS. (2024, 24 januari). *Blijvend lerarentekort raakt kwetsbare kinderen extra hard*. Retrieved on March 3, 2025 from https://nos.nl/nieuwsuur/artikel/2506134-blijvend-lerarentekort-raakt-kwetsbare-kinderen-extra-hard

Osofsky, J. D., Tonya, C. H., Moore, M. B., Callahan, K. L., Hughes, J. B., & Dickson, A. B. (2016). *The trauma of hurricane Katrina: Developmental impact on young children.* https://eric.ed.gov/?id=EJ1121877

Ogata, K. (2017). Maltreatment related trauma symptoms affect academic achievement through cognitive functioning: A preliminary examination in Japan. *Journal of Intelligence*, *5*(32), 1-7. https://doi.org/10.3390/jintelligence5040032

Peterson, J. S. (2019). Presenting a qualitative study: A reviewer's perspective. *Gifted Child Quarterly*, *63*(3), 147–158. https://doi.org/10.1177/0016986219844789

Pinter, A. (2011). *Children learning second languages*. Springer.

PO Raad. (17 december 2024). *Nieuwe cijfers laten zien dat lerarentekort weer gaat groeien*. Retrieved on March 17, 2025 from Nieuwe cijfers laten zien dat lerarentekort weer gaat groeien | PO-Raad

Ritchie, J., Lewis, J., Nicholls, C. M., & Ormston, R. (2014). *Qualitative research practice: A guide for social science students and researchers*. SAGE Publications Limited.

Sarı, M. H., & Yüce, E. (2020). Problems experienced in classrooms with students from different cultures. *Journal on Efficiency and Responsibility in Education and Science*, *13*(2), 90–100. https://doi.org/10.7160/eriesj.2020.130204

Scheele, A. F. (2010). *Home language and mono- and bilingual children's emergent academic language: A longitudinal study of Dutch, Moroccan-Dutch, and Turkish-Dutch 3- to 6-year-old children*. Utrecht: Universiteit Utrecht (dissertation). https://dspace.library.uu.nl/handle/1874/44570

Sierens, S., & Van Avermaet, P. (2014). Language diversity in education: Evolving from multilingual education to functional multilingual learning. In D. Little, C. Leung, & P. Van Avermaet (Eds.), *Managing diversity in education: Language, policies, pedagogies* (pp. 204–222). Multilingual Matters. https://doi.org/10.21832/9781783090815-014

Snow, C. E., & Kim, Y.S. (2007). Large problem spaces: The challenge of vocabulary for English language learners. In R. K. Wagner, A. E. Muse, & K. R. Tannenbaum (Eds.), *Vocabulary acquisition: Implications for reading comprehension* (pp. 123–139). Guilford Press.

Solórzano, R. W., & Solórzano, D. G. (1999). Beginning teacher standards: Impact on second-language learners and implications for teacher preparation. *Teacher Education Quarterly*, *26*(3), 37–70. http://www.jstor.org/stable/23478243

Tassoni, P. (2007). *Child development: 6 to 16 Years*. Heinemann.

Taylor, S., & Wendt, J. (2023). The relationship between multicultural efficacy and culturally responsive classroom management self-efficacy. *Journal for Multicultural Education*, *17*(1), 31–42. https://doi.org/10.1108/jme-01-2022-0006

Tielman, K., Wesselink, R., & Brok, P. D. (2021). Tensions experienced by teachers of Dutch culturally diverse senior secondary vocational education and training: an exploratory study. *International Journal of Training and Development*, *26*(1), 102–119. https://doi.org/10.1111/ijtd.12238

Tonbuloğlu, B., Aslan, D., & Aydin, H. (2016). Teachers' awareness of multicultural education and diversity in school settings. *Eurasian Journal of Educational Research*, *64*, 1-28. http://dx.doi.org/10.14689/ejer.2016.64.1

Van den Bosch, L., Segers, E., & Verhoeven, L. (2020). First and second language vocabulary affect early second language reading comprehension development. *Journal of Research in Reading*, *43*(3), 290–308. https://doi.org/10.1111/1467-9817.12304

Van der Borden, J., Lafleur, M. (2022). Didactisch handelen in de meertalige klas: Handleiding voor studenten en docenten Nederlands. *Lectoraat Meertaligheid en Onderwijs Hogeschool Utrecht*. https://www.hu.nl/-/media/hu/documenten/onderzoek/projecten/handleiding-voor-studenten-nederlands-met-voorbeeldlessen--didactisch-handelen-in-de-meertalige-klas.ashx

Van Der Kolk, B. (2015). The body keeps the score: Brain, mind, and body in the healing of trauma. *The Permanent Journal*, *19*(3). https://doi.org/10.7812/TPP/14-211

Van Tartwijk, J. J., Brok, P. P. D., Veldman, I., & Wubbels, T. (2009). Teachers' practical knowledge about classroom management in multicultural classrooms. *Teaching and Teacher Education*, *25*(3), 453–460. https://doi.org/10.1016/j.tate.2008.09.005

Verhoeven, L., Van Leeuwe, J., & Vermeer, A. (2011). Vocabulary growth and reading development across the elementary school years. *Scientific Studies of Reading*, *15*(1), 8–25. https://doi.org/10.1080/10888438.2011.536125

Vermeer, A. (2003). NT2-onderwijs en onderwijs Nederlands als moedertaal. In R. Appel (red.), De verwerving van het Nederlands als tweede taal. (pp. 80-100). Alphen aan de Rijn: Kluwer. (Leids Onderwijskundig Lexicon, editie 111).

VSNU (2018). *Nederlandse gedragscode wetenschappelijke integriteit.* DANS. https://doi.org/10.17026/dans-2cj-nvwu

Vygotsky, L. S. (1987). Thinking and speech. In Rieber, R.W. & Carton, A.S. (Eds.), *The collected works of L.S. Vygotsky, Volume 1: Problems of general psychology (pp. 39–285)*. Plenum Press.

Walton, G. M., & Cohen, G. L. (2007). A question of belonging: Race, social fit, and achievement. *Journal of Personality and Social Psychology*, *92*(1), 82–96. https://doi. org/10.1037/0022-3514.92.1.82.

Weinstein, C.S., Tomlinson-Clarke, S. and Curran, M. (2004). Toward a conception of culturally responsive classroom management. *Journal of Teacher Education*, *55*(1), pp. 25-38.

Wyman, L., & Kashatok, G. (2008). Getting to know students' communities. In M. Pollock (Ed), *Everyday antiracism: Getting real about race in school* (pp. 299-304). New Press.

About the Authors:

Richelle Dorotea SIJNSTRA
She holds a master's degree in educational sciences and is a faculty member at Eerde International Boarding School, Department of Secondary Education. She has teaching experience in primary and secondary education with a focus on language learning. Her research interests include multicultural and international education, second language learning and teaching, instructional strategies for language support, and inclusive practices for multilingual learners. She is particularly interested in how teaching strategies and scaffolding techniques can support second language learners in diverse classroom contexts, and how teacher education can address the challenges of multicultural and trauma-sensitive practices.

Anna BEN SHALOM, Dr.
In the time of the research, she was a faculty member at Utrecht University, Faculty of Social Sciences, Department of Educational Sciences, where she taught undergraduate and graduate courses. Currently, she is an educational consultant at Nyenrode Business University. Her research interests include multicultural and international education, diversity, equity, and inclusion in education, inclusive, critical, and culturally responsive teaching pedagogies, as well as participatory qualitative research.

IOJPE
ISSN: 1300 – 915X
www.iojpe.org
International Online Journal of Primary Education 2025, volume 14, issue 4

Appendix 1

Lucas & Wagner
A framework for facilitating the transition of English language learners into the mainstream in secondary schools
Part 1: Establishing Transitioning Criteria

Criteria to consider	Indicators and tools for documenting the criteria	Suggestions and comments
1. Number of years of education and type of education before coming to U.S.	(a) Student background interview upon enrolment (b) Report cards and transcripts when available	Through an interpreter, if necessary, make sure students are comfortable with examiner as they are asked to talk about themselves and their educational background.
2. Reading and writing skills in the first language	(a) Portfolios and other forms of authentic assessment (b) Informal reading inventories (c) Observations of student reading (useful even if examiner does not know the language well) (d) Writing samples	Literacy assessment should be ongoing throughout enrolment in bilingual/ESL program.
3. Reading and writing skills in English	(a) Portfolios and other forms of authentic assessment (b) Informal reading inventories (c) Observations of student reading (d) Writing samples (e) ESL class level	• National TESO standards can be used as a guide to develop assessment instruments and procedure • Measures should articulate with measures for mainstream students • Literacy assessments should be ongoing enrolment in bilingual/ESL program.
4. Success in mainstream classes while enrolled in bilingual/ESL classes	(a) Teacher questionnaire and /or interview (b) Reviewing student cumulative file and report card (c) Student interview	
5. Standardized achievement test scores	(a) Instruments adopted by district and/or state. (b) Standardized test in native language	State education agencies can identify standardized instruments for some languages.
6. English language proficiency test scores	Instruments adopted by district and/or state.	Reading and writing measures, as well as oral proficiency, should be included.
7. Academic achievement	(a) Current math placement (b) Grade point average (c) Student report card	Measures should articulate with measures for mainstream students.

	(d) Teacher questionnaire	
8. Self concept and personal inclinations toward transitioning	(a) Student interview (b) Teachers' observations	Interview should be adults with whom the students are comfortable.
9. Counsellor and/or teacher judgement	(a) Teacher questionnaire (b) Group transition team meetings	Teacher and counsellor observations of students' learning strategies, attendance, and behavior should be included.
10. Family support	(a) Student background interview (b) Counselor and/or teacher judgment	Parents should be involved in, informed of, and approve of transitioning decision

Part 2: Strategies for Facilitating the Transition

Student placement	**Strategies** 1. Place transitioning students in classes with teachers who are supportive, sensitive, knowledgeable, and experienced with cul- turally diverse ELLs. 2. Place transitioning students in designated classes with other transitioning students or with students from their language groups so they can support each other. This will also allow counselors and bilingual and ESL teachers to follow up on them. 3. Place transitioning students in smaller classes so they can get more personal attention.	**Time Frame** During the transition During the transition During the transition
Professional development	**Strategies** 4. Provide professional development for all teachers in second language acquisition and development, cross-cultural issues and communication, and sheltered ESL instruction. 5. Encourage ESL and bilingual teachers to visit mainstream classes to learn more about the content, expectations, and instruc- tional approaches. 6. Encourage mainstream teachers to visit ESL and bilingual classes to learn more about the content, expectations, and instruc- tional approaches in those classes and to learn about the students before they are transitioned.	**Time Frame** Ongoing Ongoing Ongoing
Teacher communication and collaboration	**Strategies** 7. Encourage, facilitate, and participate in interdisciplinary planning and teaching among mainstream, bilingual, and ESL teach- ers through (a)	**Time Frame** Ongoing

	joint staff development, (b) joint meetings on issues of mutual concern, (c) team teaching with planning time, and (d) joint planning of extracurricular activities. 8. Establish mechanisms for maintaining regular communication between mainstream, bilingual, and ESL teachers and coun- selors so that the latter can monitor student progress and provide assistance to students and teachers as needed.	During and after the transition
Student support services	**Strategies** 9. Establish personal connections between students and adults to develop mentors and provide foundation for support that stu- dents will need in the transition. 10. Offer as much extra intensive support as possible through, for example, (a) Saturday academies, (b) after-school tutoring, (c) an extra period during the day, (d) bilingual and ESL study halls or resource centers where students can go for extra help and native language support, and (e) summer school courses. 11. Train language minority students in mainstream classes as peer tutors so that they can support newly transitioned ELLs. 12. Ensure that transitioning students have access to counselors knowledgeable about the transition process. 13. Encourage mainstream teachers to visit bilingual and ESL classes to talk to the students about what to expect in mainstream classes.	**Time Frame** Ongoing Ongoing Ongoing During and after the transition Before the transition
Curriculum	**Strategies** 14. Offer cognitively demanding, required general education classes in formats that allow ELLs to be successful (e.g., bilingual [native language] content courses, sheltered ESL courses, or transitional courses with designated mainstream teachers trained in ESL methodology). 15. Design the curriculum to allow students to transition gradually. For example: (a) Allow students to move from native lan- guage content classes (e.g., bilingual math) to sheltered content classes (e.g., ESL biology) to regular content	**Time Frame** Before the transition Before and during the transition

	classes; (b) Offer content in bilingual/ESL courses specifically designed to teach concepts students will be expected to know in main-stream classes (e.g., events in U.S. history, how the government works, key authors in British and U.S. literature); and (c) Offer transitional classes reflecting mainstream content, structures, and processes.	
Instruction	**Strategies** 16. In order to better prepare students to succeed in mainstream classes, ensure that the bilingual and ESL classes emphasize reading and writing skills development and that bilingual and ESL teachers hold high expectations of ELLs. 17. Encourage mainstream teachers to use cooperative learning and other student interaction strategies so that students can work and learn together. 18. Ensure that instruction in content classes is sheltered and that explicit language instruction and support continue for transi- tioning students in mainstream classes.	**Time Frame** Before the transition After the transition After the transition
Staffing	**Strategies** 19. When possible, provide bilingual/bicultural instructional assistants in mainstream classes with transitioning students. 20. Make increased efforts to hire language minority teachers as mainstream teachers in all content areas.	**Time Frame** During the transition Ongoing

IOJPE
ISSN: 1300 – 915X
www.iojpe.org
International Online Journal of Primary Education 2025, volume 14, issue 4

Appendix 2
Checklist of criteria for good thematic analysis by Braun & Clarke (2006)

Table X
A 15-point checklist of criteria for good thematic analysis

Process	No.	Criteria
Transcription	1	The data have been transcribed to an appropriate level of detail, and the transcripts have been checked against the tapes for 'accuracy'.
Coding	2	Each data item has been given equal attention in the coding process.
	3	Themes have not been generated from a few vivid examples (an anecdotal approach), but instead the coding process has been thorough, inclusive and comprehensive.
	4	All relevant extracts for all each theme have been collated.
	5	Themes have been checked against each other and back to the original data set.
	6	Themes are internally coherent, consistent, and distinctive.
Analysis	7	Data have been analysed – interpreted, made sense of – rather than just paraphrased or described.
	8	Analysis and data match each other / the extracts illustrate the analytic claims.
	9	Analysis tells a convincing and well-organized story about the data and topic.
	10	A good balance between analytic narrative and illustrative extracts is provided.
Overall	11	Enough time has been allocated to complete all phases of the analysis adequately, without rushing a phase or giving it a once-over-lightly.
Written report	12	The assumptions about, and specific approach to, thematic analysis are clearly explicated.
	13	There is a good fit between what you claim you do, and what you show you have done /i.e., described method and reported analysis are consistent.
	14	The language and concepts used in the report are consistent with the epistemological position of the analysis.
	15	The researcher is positioned as active in the research process; themes do not just 'emerge'.

IOJPE
ISSN: 1300 – 915X
www.iojpe.org
International Online Journal of Primary Education
2025, volume 14, issue 4

Appendix 3
Hands-on strategies mentioned by participants and literature

10 TIPS
For Teachers to Support NT2 Students

Read about the country of origin

Students with a migration background often have a different cultural background. Read about the country of origin and the culture of your student.

Prior knowledge

Increase knowledge prior to a lesson by showing videos or images. This helps students better understand new information.

Buddy-system

Connect SLL to one or more buddies to enhance the social aspects as well-being of the student.

. Materials in the classroom

1. Enhance storytelling and make use of language games like memory, bingo, Pictionary, etc.
2. Create a mini library with short stories, comics and picture books.
3. Provide enough reading books at different levels.
4. Use visual aids for daily things (day planning, toilet, books, bag, students, etc).
5. Use digital tools such as tablets or computers

Trauma-sensitive teaching

Be aware of possible traumas in students with a migration background and adjust your lessons accordingly. Create a safe learning environment where students feel heard and understood.

Focus on group dynamics

Try to involve SLL as much as possible in group activities so that they feel part of the group and can learn through interaction with classmates.

1. Students can show something from their country or language.
2. Do regular check-ins.
3. Include the students as much as possible rather than excluding them from the activity.

Outside of school…

Encourage parents to have their children speak the native language outside of school, for example by joining a sports club or music association.

Allow speaking in their mother tongue

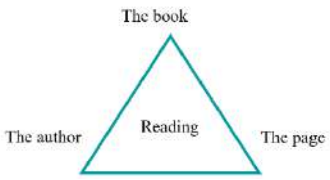
Allow SLL students to use their own language if it helps them better understand during learning, but also encourage the use of native language where possible.

Total Physical Response (TPR)

Use Total Physical Response (TPR) where movements are linked to words or sentences, so that SLL students remember and understand them better.

The word-triangle

The word-triangle is an easy way to learn new words by connecting to others. Write a word in the middle and think of related concepts. This helps students work independently and prevents them from disengaging during the lesson.



IOJPE

ISSN: 1300 – 915X
www.iojpe.org

International Online Journal of Primary Education *2025, volume 14, issue 4*

CAN MUSEUMS BE USED IN MATHEMATICS EDUCATION? PRE-SERVICE PRIMARY SCHOOL MATHEMATICS TEACHERS' PERSPECTIVES AND A DESIGN PROPOSAL

Kübra SEVİMLİ
M.Sc. Student, Dokuz Eylül University, İzmir, Türkiye
ORCID: https://orcid.org/0009-0006-1422-9932
kubra.sevimli45@gmail.com

Hacer AKSAKAL
Mathematics Teacher, Bursa, Türkiye
ORCID: https://orcid.org/0009-0009-4347-8593
hacerakkoc99@gmail.com

Serkan NARLI
Prof. Dr., Dokuz Eylül University, İzmir, Türkiye
ORCID: https://orcid.org/0000-0001-8629-8722
serkan.narli@deu.edu.tr

Kamile US
Architect, Manisa, Türkiye
ORCID: https://orcid.org/0009-0004-2015-6835
kamileus911477@gmail.com

Received: March 21, 2025 **Accepted:** November 11, 2025 **Published:** December 31, 2025

Suggested Citation:
Sevimli, K., Aksakal, H., Narlı, S., & Us, K. (2025). Can museums be used in mathematics education? Pre-service primary school mathematics teachers' perspectives and a design proposal. *International Online Journal of Primary Education (IOJPE), 14*(4), 211-238. https://doi.org/10.55020/iojpe.1662219

Abstract

This study aimed to design a prototype mathematics museum for use in mathematics education, drawing on pre-service teachers' views following a museum education course and a visit to the Tales Mathematics Museum. Employing a basic qualitative research design, this study involved 20 pre-service mathematics teachers selected through criterion sampling. Data were collected via an interview form developed by researchers and analyzed using content analysis. Findings were presented in tables and supported by direct quotations from participants. The results demonstrated that both the course and the museum visit positively influenced pre-service teachers' perceptions of museums as out-of-school learning environments. According to participants, museums provide opportunities to establish interdisciplinary connections, enrich knowledge of mathematical history, model and concretize abstract concepts, engage students, and support diverse activities. Pre-service teachers recommended that a mathematics museum should incorporate technology-supported simulations, representations of mathematical history, concrete models of theorems, and connections to daily life and art, while being designed to sustain student engagement. In conclusion, a prototype mathematics museum was developed based on these suggestions, underscoring the potential of museum-based approaches to foster meaningful, interdisciplinary, and engaging mathematics learning experiences.

Keywords: Out-of-school learning environments, museum education, pedagogy, museum design, pre-service teachers.

INTRODUCTION

Mathematics is often regarded as one of the most challenging subjects for students due to its cumulative structure, the necessity of abstract thinking, the presence of abstract concepts, and the prevalence of various preconceptions about the discipline. For students to achieve meaningful learning in mathematics, develop their abstract thinking skills, establish connections among mathematical concepts, and attain the ability to engage in mathematical practices, numerous studies

have been conducted and continue to be conducted in the literature (Altun, 2006; Bahadır & Hırdıç, 2018; Yıldız & Göl, 2014).

In today's constantly evolving and transforming world, it has been observed that educational needs are undergoing significant transformation (Göğebakan, 2018). As a result, the education provided in schools proves to be sufficient only to a certain extent, and schools are gradually losing their status as the sole institutions associated with teaching and learning (Karakaş, 2020). Consequently, the demand for alternative learning environments has grown, and out-of-school learning settings have become an integral component of the educational process (Kır et al., 2021). Thus, it is considered essential to support formal education with out-of-school learning environments that can effectively meet the needs of today's students.

Out-of-School Learning Environments

Out-of-school learning environments offer opportunities for practices that are challenging or impossible to implement within the confines of the school (Seligmann, 2015) and facilitate the integration of knowledge acquired in school with real-life situations (Aydoğdu & Aydoğdu, 2025). Therefore, these environments hold significant potential for educational activities. Research has demonstrated that such environments offer students diverse experiences that foster cognitive, affective, and psychomotor skills; enhance observation skills and long-term retention of knowledge; support connections between daily life and interdisciplinary domains; and positively influence both learning motivation and academic achievement (Eshach, 2007; Guardino et al., 2019; İnce & Akcanca, 2021; Kır et al., 2021; Saraç, 2017; Usta et al., 2023). Furthermore, these environments help students concretize abstract concepts in disciplines such as mathematics (Kuş, 2024) and contribute to the development of inquiry, problem-solving, and higher-order thinking skills by stimulating curiosity (Waite & Aronsson, 2022). In their study, Mettis et al. also emphasized that out-of-school learning environments provide meaningful and lasting learning opportunities, particularly in numerical disciplines (e.g., mathematics and science). Consequently, incorporating more activities conducted in out-of-school settings into educational processes is considered beneficial. In this regard, it is essential to conduct up-to-date research that draws upon the perspectives and experiences of educators who play an active role in the teaching–learning process.

Examples of out-of-school learning environments include mathematics and science museums, history and art museums, science centers and camps, aquariums, planetariums, and historical sites (Ertaş, 2012; Kuş, 2024).

In this study, prospective mathematics teachers' views were examined before and after a museum education course, as well as following their visit to the Aydın Tales Mathematics Museum. Based on the findings obtained, recommendations are presented for the design of an alternative museum that could be an out-of-school learning environment for mathematics education.

Museums as Out-of-School Learning Environments

Since the 1920s, museums have been recognized across different periods and societies for their fundamental functions, such as collecting, preserving, documenting, and exhibiting—and for their prominent role in education (Binekci, 2023; Yılmaz, 1996). Conducting educational activities in museums is considered significant for facilitating meaningful and lasting learning, concretizing abstract concepts, and establishing connections between education and various disciplines (Binekci, 2023). With these opportunities, museums are regarded as crucial out-of-school learning environments that enrich the teaching and learning process (Yıldız & Göl, 2014).

Museums are learning environments that extend learning beyond the classroom by supporting individuals' cognitive and behavioral development, enabling students to discover through touch and inquiry, and allowing them to experience concepts from mathematics, art, and the social sciences meaningfully (Buyurgan, 2019). However, it is noteworthy that interaction and collaboration between museums and educational institutions have not yet reached a sufficient level. Moreover, educators' perspectives on the use of museums as educational environments remain limited and require further

development (Seligmann, 2015). Hence, since 2019, the course of museum education has been included in undergraduate programs of faculties of education as either a compulsory or elective course. This reform aimed to enhance prospective teachers' ability to establish connections across different disciplinary fields, thereby incorporating the concept of the museum into the educational system (Buyurgan, 2019). These developments have underscored the significance of museum education pedagogy as an approach that enhances the role of museums in education.

The Pedagogy of Museum Education

The pedagogy of museum education is a learning approach grounded in experiential pedagogy, where the learning environment extends beyond the classroom and individuals actively participate in the learning process (Hein, 1998). In this context, experiential learning theory provides a robust framework for explaining the pedagogical value of museum environments. The stages defined in Kolb's (1984) experiential learning cycle—concrete experience, reflective observation, abstract conceptualization, and active experimentation—are closely associated with the pedagogy of museum education, enabling learners to engage in multidimensional learning experiences. A museum-based learning approach supports not only cognitive development but also the enhancement of higher-order skills such as problem-solving, creativity, critical thinking, and analytical reasoning (Andre et al., 2017).

In the context of mathematics education, museum-based learning contributes to developing positive attitudes toward learning by enabling abstract concepts to be experienced through concrete materials (Kayhan-Altay & Yetkin Özdemir, 2023; Roldán-Zafra & Perea, 2022). Moreover, providing opportunities for interdisciplinary activities facilitates the implementation of STEM practices that build bridges across diverse fields such as science, technology, engineering, and mathematics (Casi & Sabena, 2024). Therefore, the pedagogy of museum education is a learning approach that enriches teaching and learning processes, enhances pedagogical competencies, strengthens the connection between formal and informal learning environments, and holds strategic significance in fostering 21st-century skills. It considered essential that preservice mathematics teachers in faculties of education develop competencies in these areas, receive appropriate training, and reach a level at which they can apply these skills in their professional practice, thereby contributing to the process.

Literature Review

A review of the national and international literature reveals a considerable number of studies addressing museums and educational activities conducted within them as out-of-school learning environments (Akman et al., 2015; Aydoğdu et al., 2022; Aydoğdu et al., 2023; Buchholtz, 2023; Çiçek & Saraç, 2017; Demirel, 2019; Erem, 2021; Gürbey et al., 2020; Haji et al., 2019; Dere & Gökçınar, 2025; İlhan et al., 2021; Körükçü, 2019; Okoliš, 2018; Swanson & Williams, 2014; Yıldırım, 2017; Yurd & Varancı Uzun, 2024). Findings from several of these studies demonstrate that museums are effective out-of-school environments that support students' learning processes across various disciplines. For example, Akman et al. (2015) examined the views of preschool teachers on museum education. They reported that they emphasized the necessity of museum education in fostering meaningful learning in early childhood. Similarly, Gürbey et al. (2020) revealed that preservice science teachers most frequently preferred museums as out-of-school learning environments. However, they had not received any coursework on the subject, and highlighted the need for such a course. This underscores the importance of museum education courses within faculties of education. On the other hand, Demirel (2020), in a study with preservice primary school teachers, found that museum-based educational practices positively enhanced teacher candidates' self-efficacy perceptions. Likewise, Buchholtz (2023) reported that mathematics education supported by out-of-school environments such as museums provides opportunities to concretize abstract concepts, reinforce topics, and develop alternative problem-solving strategies, thereby enhancing learning motivation. Furthermore, Dere and Gökçınar (2025) investigated preschool teachers' views on out-of-school learning environments for mathematics activities and their utilization of such environments. Their findings revealed that preschool teachers considered these environments

beneficial for mathematics-related activities but encountered certain challenges during implementation. In the same study, Dere and Gökçınar (2025) also concluded that teachers preferred various out-of-school learning environments to connect subjects with everyday life, make lessons more engaging, and enable students to learn through authentic experiences. They further found that lessons conducted in these settings increased students' interest in mathematics and enhanced their problem-solving skills. Similarly, Swanson and Williams (2014) and Aydoğdu et al. (2023) reported that both preservice and in-service mathematics teachers recognized museums as having significant potential as out-of-school learning environments for mathematics education.

Significance and Purpose of this Study

In the field of literature, studies involving preservice or in-service mathematics teachers is limited, and existing research has largely remained confined to teachers' opinions. This indicates a significant gap in the field. Therefore, the present study aims to overcome this limitation by designing a prototype mathematics museum that can be utilized in mathematics education, based on the views of preservice mathematics teachers. The prototype mathematics museum, developed in line with these views, is expected to provide educators with an alternative out-of-school learning environment for teaching mathematics. This study holds considerable value in supporting the professional development of preservice teachers and in guiding innovative practices in mathematics instruction. At the same time, the research is anticipated to contribute to the literature by offering new insights how out-of-school learning environments can be effectively integrated into mathematics education.

Within the scope of the study, the research problem was defined as follows: *"What are the views of preservice mathematics teachers regarding the use of museums in mathematics education, and how can a mathematics museum be designed in line with these views?"* In addition, to examine the perspectives of preservice mathematics teachers following the introduction of the "museum education" course into education faculties as of 2019 and their visit to the Tales Mathematics Museum located in Aydın during the study, the following sub-problems were addressed.

a) What are preservice teachers' views who have taken the museum education course compared to those who have not?

b) What are preservice teachers' views after taking the museum education course?

c) What are preservice teachers' views after visiting the mathematics museum?

d) Can a mathematics museum be designed considering the views of preservice teachers?

METHOD

Research Design

In this study, a qualitative research paradigm was adopted. Qualitative research is an inductive approach that aims to transparently reveal phenomena and events from participants' perspectives within natural settings, without any intervention (Creswell, 2021; Yıldırım & Şimşek, 2021). This approach requires researcher to remain flexible throughout the process and to adjust the study's course based on the data, thereby adopting an inductive perspective (Merriam & Tisdell, 2016). In the present study, a basic qualitative research design was employed to examine the experiences of preservice mathematics teachers with the museum education course and the museum visit. The basic qualitative research design is utilized to uncover individuals' experiences and perceptions of a particular phenomenon (Merriam & Tisdell, 2016; Patton, 2014).

Participants

The study's participant group comprised 20 preservice mathematics teachers enrolled at a public university. Criterion sampling, a purposeful sampling method, was employed to determine the participant group. Criterion sampling is a method that enables the inclusion of participants who meet the criteria established in line with the study's purpose (Yıldırım & Şimşek, 2021). In this research, the criterion was defined as follows: at the beginning of the semester, 10 participants had chosen the

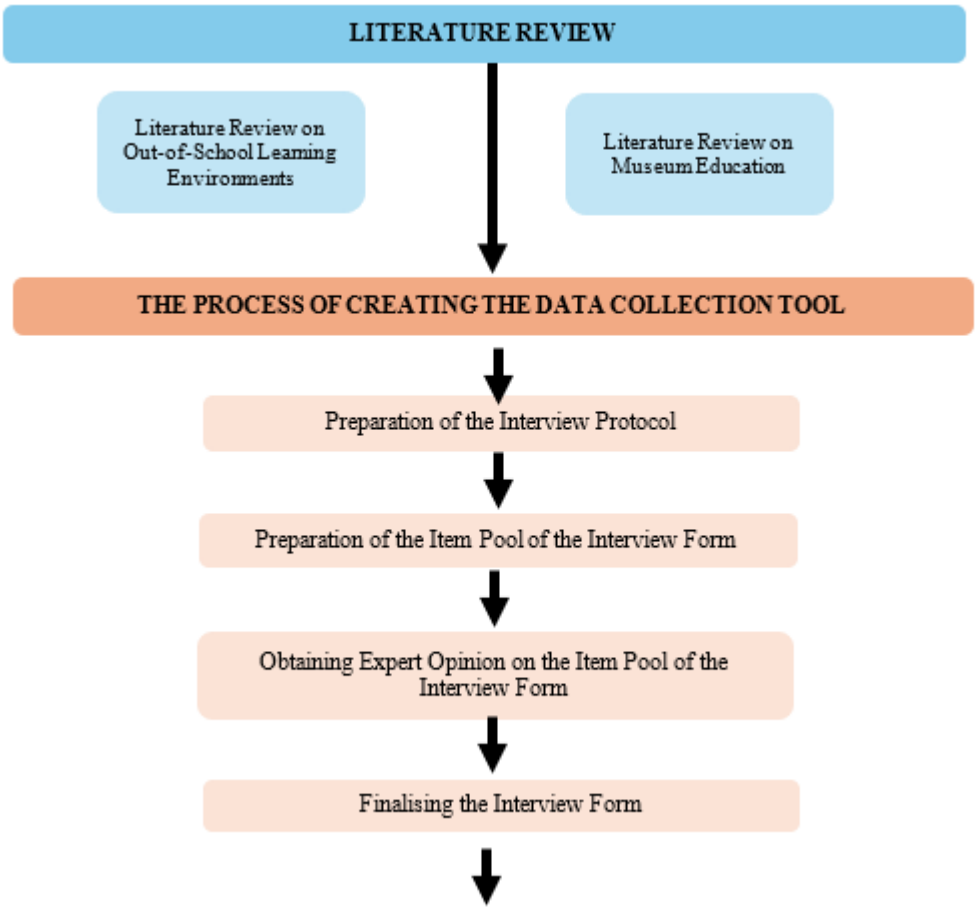
museum education course, while the other 10 had not. This allowed for the examination of the benefits of the museum education course and its impact on preservice teachers' perspectives.

Data Collection Tool and Process

An interview form was used as the data collection instrument. During the development process, the researchers conducted a literature review and subsequently generated an item pool for the interview form. In the final stage, expert opinion was obtained from a professor in mathematics education, and the interview form was finalized accordingly. The interview form is presented in Appendix 1.

The interview form was administered at the beginning of the semester to 20 preservice mathematics teachers (both those who had chosen and those who had not selected the museum education course). At the end of the semester, after completing the museum education course (14 weeks), all 20 preservice teachers visited the Tales Museum located in Aydın, where activities related to mathematics education were examined. Additionally, ideas were exchanged on how mathematics museums can be utilized in mathematics education. After the museum visit, the interview form was again administered to all preservice mathematics teachers, and the data were collected accordingly.

The research process cycle related to the development of the data collection instrument and the data collection procedure is presented in Figure 1.



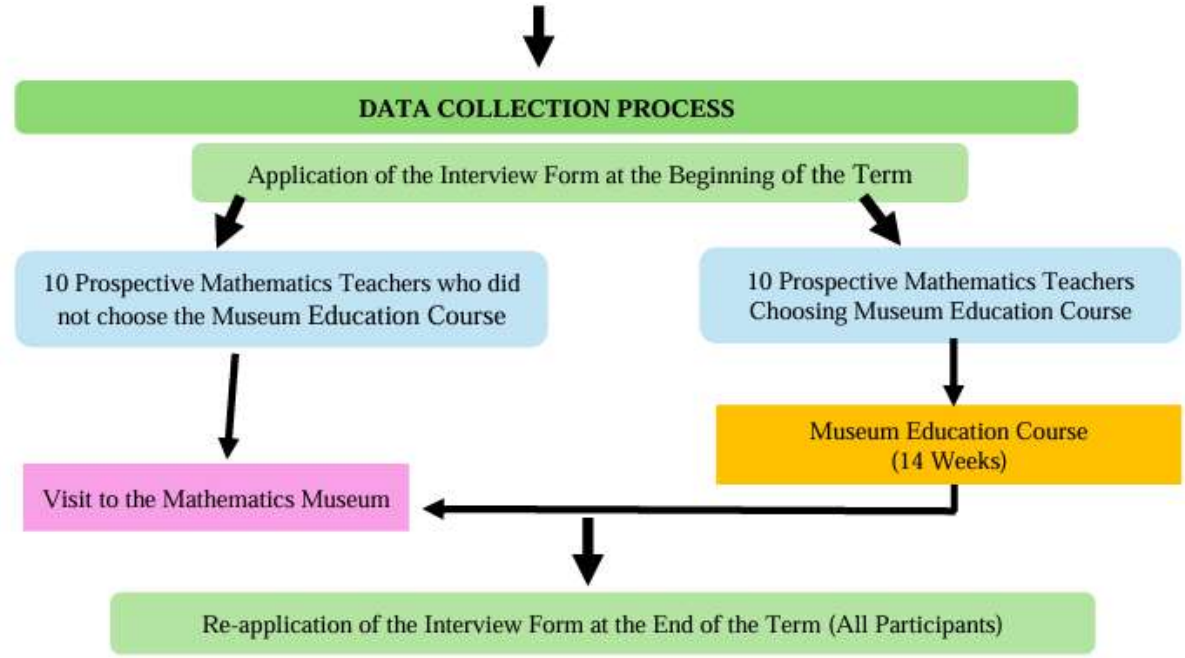


Figure 1. Research process cycle.

Data Analysis

In line with the aim of this study, the data were analyzed using content analysis, one of the qualitative research techniques. Content analysis is a systematic method that enables data of a similar nature to be organized within predetermined codes, categories, and themes, and subsequently interpreted from a holistic perspective to provide the reader with a clear and comprehensive understanding (Krippendorff, 2019; Yıldırım & Şimşek, 2021). The data subjected to content analysis were summarized and interpreted in tabular form within the categories determined in the context of the sub-problems.

In the data analysis process, two researchers in the research team initially examined the interview forms independently and simultaneously. Categories were created based on participants' responses in the interview forms. Subsequently, the two researchers came together to evaluate the categories they had developed. Categories with differences of opinion were identified, and to reach a consensus, another researcher from the research team was included in the analysis process. The three researchers discussed the categories with differing opinions and reviewed the literature to reach a joint decision. For instance, in the initial stage, the categories "modeling" and "concretization" were created separately; however, since responses related to modeling also encompassed aspects of concretization, the two categories were merged into "modeling and concretization" by consensus. Approximately five months after this initial analysis, the data were independently re-examined and discussed a second time. No changes to the categories from the first analysis were made during this second review, thereby confirming the final form of the categories. In the subsequent stage, the number of participant responses was determined, tabulated along with their frequencies, and presented in tables in the findings section. To ensure the objectivity and transferability of the research, direct excerpts from participants' responses were included and interpreted while presenting the findings. Based on the results obtained, a prototype mathematics museum was designed by the second and fourth authors of the research team.

RESULTS

At this stage of this study, the findings obtained from the analysis of participants' responses to the interview questions at the beginning and end of the semester (after the museum visit) are presented. As preservice teachers sometimes provided responses that could fall into more than one category, discrepancies may be observed in the total frequencies.

1. Findings on the Views of Preservice Teachers Who Have and have not Taken the Museum Education Course

The data obtained for the sub-problem of this study, "Are there differences in the views of preservice teachers who have and have not taken the museum education course?" are presented below.

In Table 1, the responses of preservice teachers who had not taken (f = 10) and those who had taken (f = 10) the museum education course to the interview question, "What does the concept of a museum evoke for you? What kind of place comes to mind when you think of a museum?" are examined.

Table 1. The connotations of the concept of museum in pre-service teachers who take and do not take museum education courses.

Categories	**Question 1: Answers of Teacher Candidates Who Have Not Taken Museum Education Course** Frequencies	**Question 1: Answers of pre-service teachers who have taken museum education courses** Frequencies
Exhibition (Item – Artwork-Art)	7	7
Historical Site	9	2
Informative EducationTeaching Environment	2	7
Institution Serving Its Purpose	0	1

The analysis revealed that preservice teachers who had not taken the museum education course predominantly associated the concept of a museum with exhibition spaces (38.8%) and historical sites (50%). In contrast, preservice teachers who had taken the museum education course more frequently described a museum as an informative educational environment (41.1%). It can be stated that there is a relative difference in the responses provided by preservice teachers who had taken the course and those who had not.

In the interview form administered to the participants, the question, "Have you visited a museum before? If yes: a) How frequently do you visit museums?, b) What types of museums have you visited? Please specify," elicited responses indicating that none of the preservice teachers had previously visited a mathematics museum.

In Table 2, the responses of preservice teachers who had not taken (f = 10) and those who had taken (f = 10) the museum education course to the interview question, "For what purposes do you think people can visit museums?" are examined.

Table 2. The thoughts of pre-service teachers who take and do not take museum education courses about the purposes for which they can go to museums.

Categories	**Question 3: Answers of Teacher Candidates Who Have Not Taken Museum Education Course** Frequencies	**Question 3: Answers of pre-service teachers who have taken museum education courses** Frequencies
For Hobby Purposes	5	1
For Travel-Observation Purposes	4	4
For Acculturation	3	4
For Educational Purposes	7	11

The analysis indicated that preservice teachers who had taken and those who had not taken the museum education course generally provided similar responses; however, preservice teachers' perspectives who had taken the course regarding the use of museums for educational purposes were more prominent.

In Table 3, the responses of preservice teachers who had not taken (f = 10) and those who had taken (f = 10) the museum education course to the interview question, "Do you think museums can be considered as out-of-school learning environments? If so, what types of educational activities can they be used for? Please explain," are examined.

Table 3. The thoughts of pre-service teachers who take and do not take museum education courses on what kind of educational activities museums can be used in.

Categories	**Question 4: Answers of Teacher Candidates Who Have Not Taken Museum Education Course** Frequencies	**Question 4: Answers of pre-service teachers who have taken museum education courses** Frequencies
Lessons	5	2
Interdisciplinary Activities	0	1
Material Usage	1	4
For Application Purposes	2	5
For Reinforcement Purposes	0	3
For Concretization Purposes	2	4

The analysis revealed that preservice teachers who believed museums could be used for instructional, reinforcement, and concretization purposes in educational activities were predominantly those who had taken the museum education course.

Analysis of the responses to the question, "Have you ever had the opportunity to receive training in any museum?" included in the interview form administered to the participants revealed that, except for one preservice teacher, none had previously received training in any museum.

In Table 4, the responses of preservice teachers who had not taken (f = 10) and those who had taken (f = 10) the museum education course to the interview question, "Do you think it is possible to utilize museums in mathematics education? Please explain," are examined.

Table 4. The thoughts of pre-service teachers who take and do not take museum education courses that museums can be used in mathematics education.

Categories	**Question 7: Answers of Teacher Candidates Who Have Not Taken Museum Education Course** Frequencies	**Question 7: Answers of pre-service teachers who have taken museum education courses** Frequencies
	Yes	**Yes**
Modeling and Concretization	2	8
Extracurricular Learning Activity	2	0
Association	2	1
History of Mathematics	4	1
Attract Attention	3	1
Make an Application	0	5
	No	**No**
No Idea/Unclear	4	0

Examination of the responses revealed differences in the views of preservice teachers who had taken and those who had not taken the museum education course. These differences were particularly evident in the categories of modeling and concretization (42.1%) and performing applications (26.3%). Notably, one preservice teacher who had not taken the museum education course expressed the view that it is not possible to utilize museums in mathematics education.

2. Findings on Preservice Teachers' Perspectives Following the Museum Education Course

The data obtained for the sub-problem, "Do preservice teachers' perspectives change after taking the museum education course?" are presented below. For this sub-problem, the interview form was administered twice to 10 preservice teachers: once before and once after taking the museum education course.

In Table 5, the responses of preservice teachers to the question, "What does the concept of museum evoke for you? What kind of place comes to mind when you think of the museum?" in the interview form are examined, comparing their answers before and after taking the museum education course.

Table 5. The connotations of the Concept of Museum in pre-service teachers before and after taking the museum education course.

Categories	Question 1: Answers Before the Museum Education Course Frequencies	Question 1: Answers After the Museum Education Course Frequencies
Exhibition (Item – Artwork-Art)	8	7
Historical Site	4	2
Informative EducationTeaching Environment	5	7
Institution Serving Its Purpose	0	1

The analysis revealed that, before taking the museum education course, 29.4% of the preservice teachers described the concept of museum as an informative educational environment, whereas after the course, this proportion increased to 41.1%.

In Table 6, the responses of preservice teachers to the question, "For what purposes do you think people can visit museums?" in the interview form are examined, comparing their answers before and after taking the museum education course.

Table 6. Before and after taking the museum education course, pre-service teachers' thoughts on the purposes of going to museums.

Categories	Question 3: Answers Before the Museum Education Course Frequencies	Question 3: Answers After the Museum Education Course Frequencies
For Hobby Purposes	3	1
For Travel-Observation Purposes	4	4
For Acculturation	4	4
For Educational Purposes	8	11

The analysis revealed that, after taking the museum education course, preservice teachers' views regarding visiting museums for recreational purposes decreased, whereas their perceptions of visiting museums for instructional purposes increased.

In Table 7, the responses of preservice teachers to the question, "Do you think museums can be considered as out-of-school learning environments? If so, in what types of instructional activities can they be utilized? Please explain," in the interview form are examined, comparing their answers before and after taking the museum education course.

Table 7. Teacher candidates' thoughts on what kind of educational activities museums can be used for before and after taking the museum education course.

Categories	Question 4: Answers Before the Museum Education Course Frequencies	Question 4: Answers After the Museum Education Course Frequencies
Lessons	4	2
Interdisciplinary Activities	1	1
Material Usage	3	4
For Application Purposes	1	5
For Reinforcement Purposes	0	3
For Concretization Purposes	0	4

The analysis revealed that, after taking the museum education course, preservice teachers demonstrated an understanding that museums can be utilized in instructional activities for practice, reinforcement, and concretization purposes. Based on this finding, it is suggested that the museum education course has a positive contribution to preservice teachers' awareness of the diversity of instructional activities in which museums can be employed.

When examining the responses to the question, "Do you think there can be a relationship between the concepts of mathematics and museums? Please explain," in the interview form applied to the participants, it was observed that, over the course of the term, preservice teachers who took the museum education course showed an increase in responses indicating "concretizing abstract mathematical concepts in the museum" at the end of the term.

In Table 8, the responses of preservice teachers to the question, "Do you think it is possible to utilize museums in mathematics education? Please explain," in the interview form are examined, comparing their answers before and after taking the museum education course.

Table 8. Before and after taking the museum education course, pre-service teachers' thoughts on the use of museums in mathematics education.

Categories	Question 7: Answers Before Museum Education Course Frequencies	Question 7: Answers After the Museum Education Course Frequencies
	Yes	**Yes**
Modeling and Concretization	2	8
Extracurricular Learning Activity	1	0
Material Usage	1	3
Association	2	1
History of Mathematics	2	1
Attract Attention	1	1
Make an Application	0	5
	No	**No**
No Idea/Unclear	3	0

As a result of this analysis, it was first observed that the perspectives of three preservice teachers, who initially believed that it was not possible to utilize museums in mathematics education, changed following the museum education course. Moreover, the perception that museums could be employed for modeling and concretizing mathematical concepts increased from 22.22% before the course to 42.1% after the course. Additionally, while preservice teachers did not initially consider that practice-oriented activities could be conducted in museums for mathematics education, 26.3% of them adopted this perspective after completing the museum education course.

3. Findings regarding Pre-Service Teachers' Perspectives Following the Museum Visit

The data obtained for the sub-problem of the study, "Does a difference emerge in pre-service teachers' perspectives after visiting the mathematics museum?" are presented below. For this sub-problem, the interview form was administered twice to 10 pre-service teachers who had not taken the museum education course: once before and once after visiting the mathematics museum.

In Table 9, the pre-service teachers' responses to the question, "What does the concept of museum evoke for you? What kind of place comes to mind when you think of the museum?" in the interview form administered to the participants were examined before and after they visit the mathematics museum.

Table 9. Connotations of the concept of museum in pre-service teachers before and after the museum visit.

Categories	Question 1: Answers Before the Museum Visit Frequencies	Question 1: Answers After the Museum Visit Frequencies
Exhibition (Item – Artwork-Art)	7	6
Historical Site	9	3
Informative EducationTeaching Environment	2	7

As a result of the examination, it was observed that before visiting the mathematics museum, the pre-service teachers described the concept of a museum as a historical site at a rate of 50%, whereas after the museum visit, this rate decreased to 18.75%. Another noteworthy finding is that the proportion of pre-service teachers characterizing museums as informative educational environments increased from 11.1% before the museum visit to 43.75% after the visit.

Table 10 presents the responses of pre-service teachers to the question, "For what purposes do you think people can visit museums?" in the interview form, examined before and after visiting the mathematics museum.

Table 10. Pre-service teachers' perceptions of the purposes for which museums can be visited, before and after the museum visit

Categories	Question 3: Answers Before the Museum Visit Frequencies	Question 3: Answers After the Museum Visit Frequencies
For Hobby Purposes	5	1
For Travel-Observation Purposes	4	4
For Acculturation	3	3
For Educational Purposes	7	8

As a result of the analysis, it was observed that pre-service teachers provided generally similar responses before and after the mathematics museum visit; however, their perceptions regarding the use of museums for recreational purposes showed a relative change following the visit.
Table 11 presents the responses of pre-service teachers, before and after the mathematics museum visit, to the question in the interview form: 'Do you think museums can be considered as out-of-school learning environments? If so, what types of educational activities can they be used for? Please explain.

Table 11. Pre-service teachers' perceptions of the types of educational activities in which museums can be utilized, before and after the museum visit.

Categories	Question 4: Answers Before the Museum Visit Frequencies	Question 4: Answers After the Museum Visit Frequencies
Lessons	5	5
Interdisciplinary Activities	0	2
Material Usage	1	4
For Application Purposes	2	4
For Reinforcement Purposes	0	2
For Concretization Purposes	2	4

As a result of the analysis, it is noteworthy that after the museum visit, the pre-service teachers' perceptions that museums can be utilized in educational activities for interdisciplinary purposes, material usage, practice, reinforcement, and concretization increased.

Table 12 presents the responses to the question, "Do you think it is possible to benefit from museums in mathematics education? Please explain," included in the interview form administered to the participants.

Table 12. Pre-service teachers' perspectives on the potential use of museums in mathematics education before and after the museum visit.

Categories	Question 7: Answers Before the Museum Visit Frequencies	Question 7: Answers After the Museum Visit Frequencies
	Yes	**Yes**
Modeling and Concretization	2	7
Extracurricular Learning Activity	2	0
Association	2	2
History of Mathematics	4	4
Attract Attention	3	3
Make an Application	0	4
	No	**No**
No Idea/Unclear	4	2

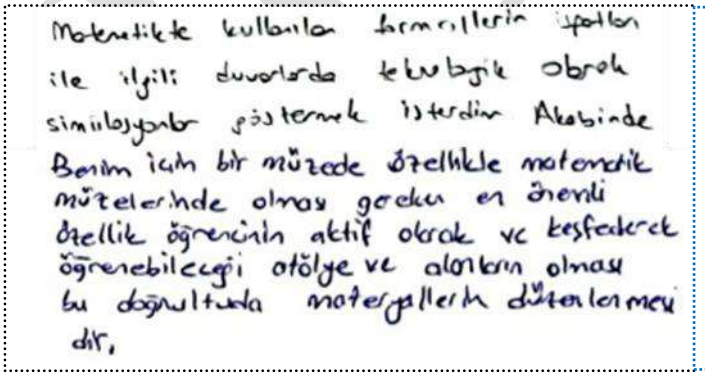
Based on the analysis, differences were observed in the pre-service teachers' perspectives before and after the mathematics museum visit. This variation is particularly evident in the categories of modeling and concretization (35%) and conducting practical activities (20%). Additionally, it is noteworthy that the views of two pre-service teachers regarding the impossibility of utilizing museums in mathematics education remained unchanged after the museum visit.

4. Findings Regarding the Design Features of a Mathematics Museum Based on Pre-Service Teachers' Perspectives

For the sub-problem of the study, "Can a mathematics museum be designed based on pre-service teachers' perspectives?", the responses provided by the pre-service teachers after completing the museum education course and visiting the museum were evaluated. In addition, mathematics museums in Turkey and around the world were examined to design a prototype mathematics museum that would serve the purposes of mathematics education.

In the museum design process, the pre-service teachers' suggestions, the aspects of these suggestions that distinguish them from existing mathematics museums, and the points in the visited mathematics museum that could be improved from the perspective of the pre-service teachers were considered, along with the insights of an architect. Based on all these criteria, excerpts related to the design of the planned prototype mathematics museum are presented below.

An analysis of the pre-service teachers' responses revealed that they suggested exploratory activities within the museum, varying workshop programs, and the integration of technology into the mathematics education process (see Figure 2).



"I'd like to display technological simulations on the walls to demonstrate the proofs of mathematical formulas. For me, the most important feature of a museum, especially a mathematics museum, is the availability of workshops and spaces where students can learn actively and through exploration, and the organization of materials accordingly."

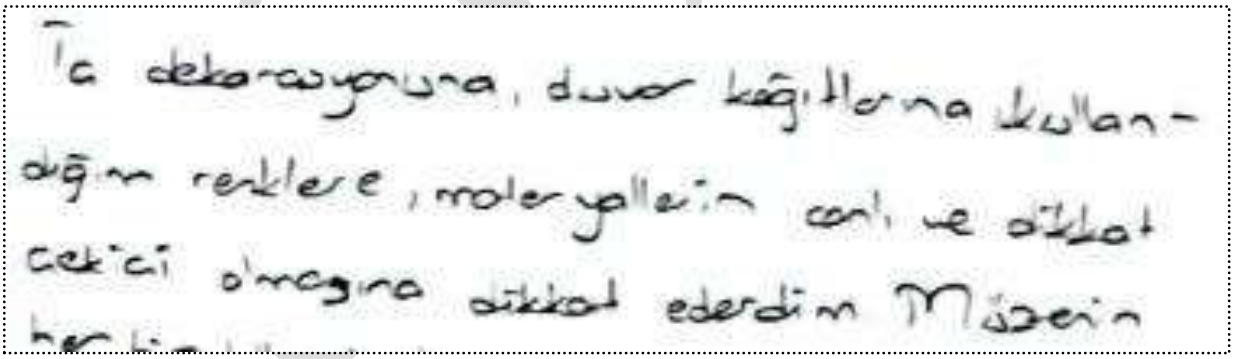
Figure 2. Excerpts from the suggestions of the pre-service teachers.

Taking the suggestions into account, a panoramic space was designed at the upper section of the museum (see Figure 2). In this space, a prototype hall for mathematics education was designed with simulation and technology support. The simulation of the designated topic was intended to be

projected at the center of the hall so that visitors could easily observe it. It was envisaged that the designated topic would be updated cyclically on a monthly basis, thereby ensuring the dynamism and continuity of visits to the museum.

Figure 3. Panorama and simulation hall.

An analysis of the pre-service teachers' responses revealed that they suggested the museum's interior design should be vibrant and eye-catching, incorporate various geometric forms in the design, and potentially utilize fractal geometry, among other recommendations (see Figure 3a).



"I would pay attention to interior decoration, the colors I used in wallpapers, and the materials to make them vibrant and eye-catching."

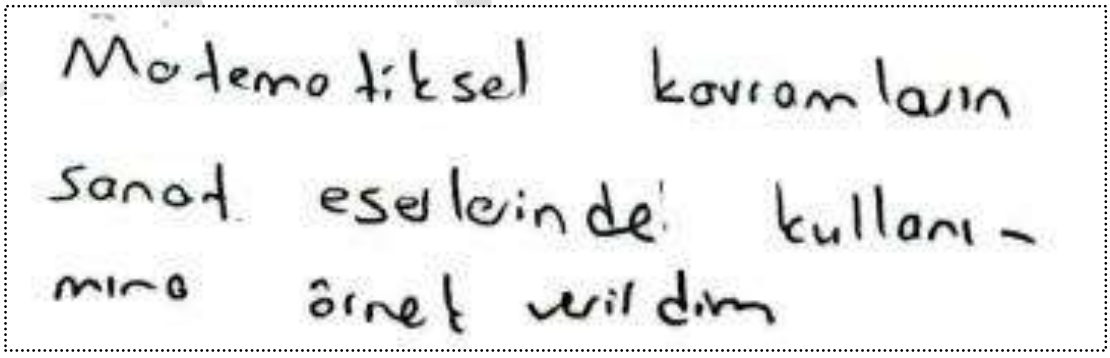
Figure 3a. Excerpts from the suggestions of the pre-service teachers.

Based on the suggestions of the pre-service teachers, a transitional space was designed within the museum (see Figure 4). In this design, fractal geometry, patterns, and ornamental elements were utilized to make the interior environment engaging, with a strong emphasis on aesthetic perception.

IOJPE
ISSN: 1300 – 915X
www.iojpe.org
International Online Journal of Primary Education 2025, volume 14, issue 4

Figure 4. Transitional space.

When examining the responses of the pre-service teachers, it was observed that they emphasized the need to reflect the relationships between mathematics and other disciplines within the museum. Furthermore, suggestions were also made regarding the integration of mathematics and the arts within the museum (see Figure 5).



"I would give examples of the use of mathematical concepts in works of art."

Figure 5. Excerpts from the suggestions of the pre-service teachers.

Based on the suggestions of the pre-service teachers, illusion halls were designed where visitors can both engage and take photographs, enjoy their time, and simultaneously experience the integration of mathematics and art through the works of the renowned painter and graphic artist M. C. Escher. In this way, an emphasis was placed on highlighting the multifaceted nature of mathematics (see Figure 6, and Figure 7).

IOJPE
International Online Journal of Primary Education
ISSN: 1300 – 915X
www.iojpe.org
2025, volume 14, issue 4

Figure 6. Room of illusion: Escher.

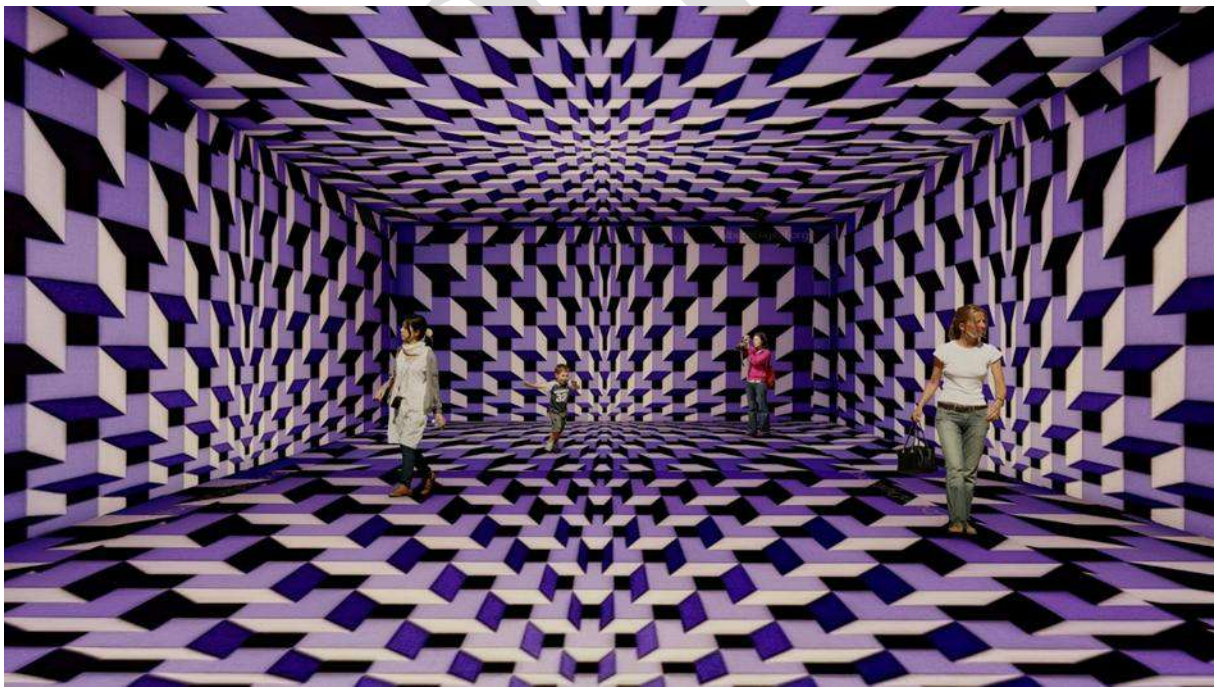
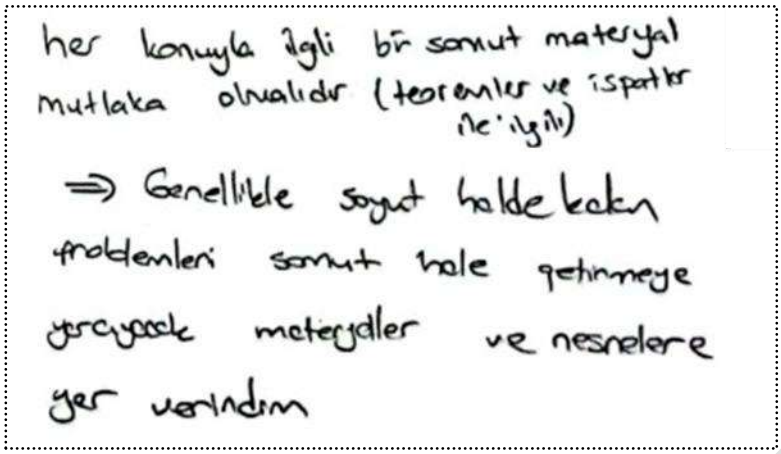


Figure 7. Illusion room perspective.

An analysis of the pre-service teachers' responses revealed that they suggested concretizing concepts in mathematics such as theorems and proofs, exhibiting them in the form of materials, and creating 3D models (see Figure 8).

IOJPE
ISSN: 1300 – 915X
www.iojpe.org
International Online Journal of Primary Education 2025, volume 14, issue 4



"I would usually include materials and objects that would help make abstract problems concrete."

"There must be concrete material related to every topic (related to theorems and proofs)."

Figure 8. Excerpts from the suggestions of the pre-service teachers.

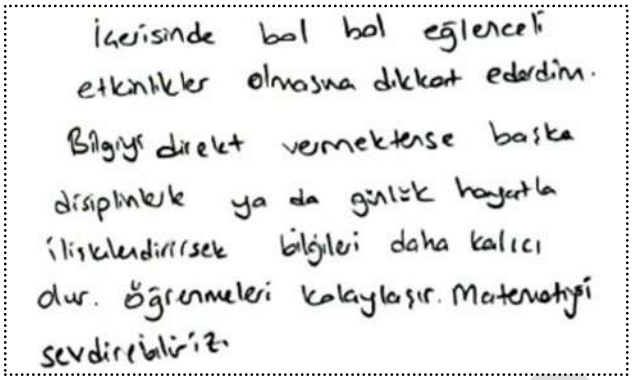
Based on the suggestions of the pre-service teachers, proof rooms were designed with the aim of presenting to visitors, in a tangible form through models, concepts such as the Klein bottle and Möbius strip using abstraction, as well as the set of points equidistant from a given point forming a circle (see Figure 9, and Figure 10).

Figure 9. Proof room: 1

Figure 10. Proof room: 2

An examination of the pre-service teachers' responses indicated that their suggestions included the design of museum spaces that, through engaging and enjoyable activities, could foster a positive attitude toward mathematics and capture the interest of both students and visitors (see Figure 11).

IOJPE
ISSN: 1300 – 915X
www.iojpe.org
International Online Journal of Primary Education 2025, volume 14, issue 4



"I would make sure to include plenty of fun activities. Rather than simply imparting information directly, connecting it to other disciplines or daily life will make it more memorable. It makes learning easier. We can foster a love of math."

Figure 11. Excerpts from the suggestions of the pre-service teachers

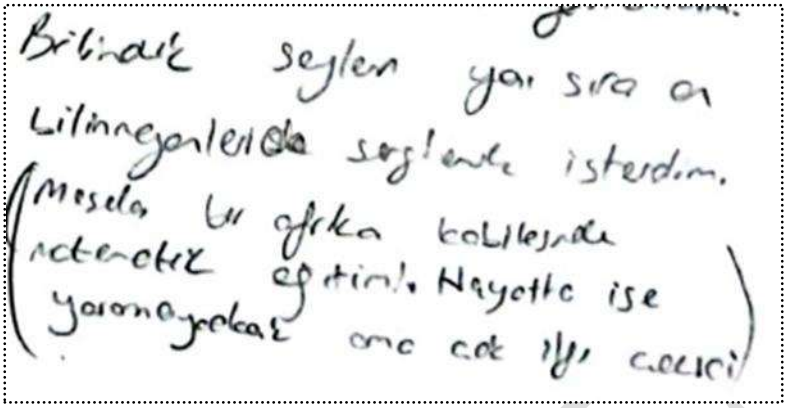
In line with the pre-service teachers' suggestions, a movable wall design was created based on geometric structures with the aim of attracting visitors' interest and fostering a positive attitude toward mathematics (see Figure 12). In this way, it was intended that visitors could rearrange the geometric shapes on the wall to generate different figures. For instance, the museum guide might set specific goals for visitors with questions such as, "Can you create a rabbit from geometric structures?" thereby enhancing engagement. Furthermore, through the designed geometry room (see Figure 13), it was planned that visitors would gain a better understanding of the properties of geometric shapes (e.g., number of sides, edges, and vertices), while the dimensions of the shapes would capture their attention and stimulate curiosity.

Figure 12. Puzzle room

Figure 13. Geometry room

Upon evaluating the responses of the pre-service teachers, it was observed that they proposed the inclusion of spaces reflecting mathematics from different cultures within the museum to be designed (see Figure 14).

IOJPE
ISSN: 1300 – 915X
www.iojpe.org
International Online Journal of Primary Education 2025, volume 14, issue 4



"I'd like to learn about unknown things as well as familiar ones. (For example, math education in an African tribe. It won't be useful in real life, but it's very interesting.)"

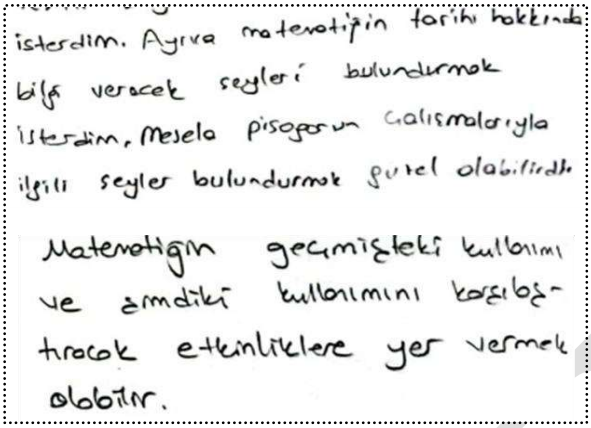
Figure 14. Excerpts from the suggestions of the pre-service teachers

Based on the recommendations of the pre-service teachers, the design sought to construct a space intended to illuminate the relationship of mathematics within diverse cultural contexts (see Figure 15). Within this design framework, particular emphasis was placed on the figures traditionally inscribed in the sand, representing foundational manifestations of mathematics in African tribal practices.

Figure 15. Culture and mathematics room.

An examination of the pre-service teachers' responses revealed suggestions for including space within the museum that addresses the relationship between mathematics and history (see Figure 16).

IOJPE
ISSN: 1300 – 915X
www.iojpe.org
International Online Journal of Primary Education 2025, volume 14, issue 4



"I'd also like to include some information about the history of mathematics. For example, it would be nice to include information about the works of Pythagoras."

"It may be to include activities that compare the past and present use of mathematics."

Figure 16. Excerpts from the suggestions of the pre-service teachers.

Drawing upon the recommendations of the pre-service teachers, the present design sought to establish a space that effectively conveys the intricate relationship between mathematics and history (see Figure 17, Figure 18, and Figure 19). In this context, the environment was meticulously conceived to allow visitors to gain comprehensive insights into the lives of eminent mathematicians and critically examine their contributions to the field, while simultaneously experiencing the historical periods in which they lived. Moreover, the designed space is intended to provide visitors with a platform to engage in a comparative analysis of the applications of mathematics across past and contemporary contexts, thereby fostering a deeper appreciation of its evolution and relevance.

Figure 17. History of mathematics room: 1

IOJPE
ISSN: 1300 – 915X
www.iojpe.org
International Online Journal of Primary Education 2025, volume 14, issue 4

Figure 18. History of mathematics room: 2

Figure 19. History of mathematics room: 3

As presented above, the recommendations provided by the pre-service teachers were thoroughly examined and systematically coded by the researchers. Subsequently, the coded suggestions were submitted to an architect for professional evaluation. Drawing upon the architect's feedback, the necessary interpretative refinements were incorporated, thereby facilitating the transition to the museum design phase. The resulting designs were primarily developed as interior layouts, aligned with the predetermined categories. Upon implementation, it is anticipated that these designs would be consolidated into a cohesive and comprehensive spatial arrangement.

DISCUSSION, CONCLUSION, and RECOMMENDATIONS

Analysis of the responses provided by pre-service teachers at the beginning of the semester (prior to the museum visit) indicated that they predominantly associated the concept of a museum with learning about the past and acquiring historical knowledge. From this perspective, it can be inferred that pre-service mathematics teachers exhibit limited awareness of the existence and role of mathematics and science museums. A possible explanation for this finding, as reflected in the data, is that most of these teachers had not previously visited any mathematics museum. This result aligns with the findings of Aydoğdu et al. (2022), who investigated the use of virtual museums as an instructional tool in mathematics education.

An analysis of the initial responses provided by pre-service teachers indicated that they were unable to establish any connection between mathematics education and museums. Subsequent responses, however, revealed a notable shift in their perspectives. This change is likely attributable to the museum education course undertaken during the semester, combined with the mathematics museum visit conducted at the end of the term. Moreover, most participants reported that, following the museum education course, they perceived museums as valuable out-of-school learning environments that improve instruction across various topics and concepts in mathematics. These findings are consistent with existing literature. For example, Bahadır and Hırdıç (2018) highlighted that learning activities conducted within a mathematics museum enhanced students' ability to relate mathematics to daily life and supported conceptual understanding. Similarly, Casi and Sabena (2024) examined the potential of museums for the professional development of primary and secondary school teachers, demonstrating that the use of museums as out-of-school learning environments holds considerable promise. Based on the findings of the present study, it was also determined that incorporating museum education courses as compulsory, rather than elective, components within undergraduate teacher education programs could positively influence pre-service teachers' capacity to establish

interdisciplinary connections, actively utilize museums as out-of-school learning environments, and cultivate innovative perspectives. This outcome aligns with Erem's (2019) study, which reported that museum education courses provided innovative opportunities for classroom teachers and fostered changes in their perspectives. Furthermore, Erem (2019) recommended that such courses be made compulsory during undergraduate training, reflecting a parallel with the current findings. Yıldırım (2017) similarly advocated for the inclusion of museum-focused courses in teacher education programs, emphasizing the educational potential of museums. The finding that pre-service teachers perceive museums as environments conducive to learning further supports the perspectives expressed by mathematics teacher candidates in the present study. In addition, Dumont et al. (2025) found that digital museum education activities facilitate knowledge exploration and promote interdisciplinary engagement, corroborating the present results. Finally, Okvuran, and Karadeniz (2022) demonstrated that the "museum-school" model developed in Turkey fosters discovery and creativity, underscoring the importance of providing teachers with professional training on effectively implementing educational activities within museums. These findings highlight the critical role of equipping educators with the necessary knowledge and skills to conduct teaching and learning activities within museums as alternative out-of-school learning environments.

The visit to the Tales Mathematics Museum led to a positive transformation in pre-service mathematics teachers' perspectives on mathematics education. Existing literature suggests that museum visits and educational activities conducted within museums can facilitate meaningful changes in both learners and educators. For example, Casi and Sabena (2024) reported that in-service training provided to mathematics teacher candidates in the context of Art and History Museums demonstrated that museum visits or experiential activities effectively enhanced candidates' interdisciplinary mathematical understanding and pedagogical strategies. Similarly, Holmes (2011) found that hands-on science museum experiences significantly improved students' science achievement in Louisiana, whereas Kisida et al. (2016) observed that art museums fostered the development of critical thinking and inquiry skills. Furthermore, İlhan et al. (2021) concluded that museum visits contributed to long-term retention and learning among social studies teacher candidates. Gürbey et al. (2020) examined pre-service science teachers' perceptions of museum education as part of out-of-school learning environments. They underscored the importance of combining theoretical instruction with practical experiences, facilitating museum visits, increasing their frequency, and promoting diverse museum options to enhance the effectiveness of educational activities. The study also highlighted that teacher candidates emphasized the necessity of raising teachers' awareness, establishing new mathematics museums, and organizing visits to integrate museums effectively into mathematics education. In addition, participants suggested that topics frequently included in mathematics curricula—such as probability, geometry, and the history of mathematics—should be represented within museum contexts. However, this finding differs from that of Kayhan-Altay and Yetkin-Özdemir (2023), who reported that although middle school mathematics teacher candidates incorporated museum resources into lesson plans across various mathematical concepts, geometry topics were included to a lesser extent compared with other subjects.

Contemporary museums are increasingly evolving from their traditional functions to provide spaces that integrate entertainment and educational purposes (Okvuran & Karadeniz, 2022). Observations suggest that these institutions seek to engage visitors through architectural design and functional features (Uysal, 2013). At present, there is a discernible shift from a static museum paradigm toward a more dynamic and interactive model (Sezgin Özrili & Özrili, 2021). This development is consistent with the findings of Dumont et al. (2025), who reported that digital museum experiences effectively capture learners' attention, according to educators' perspectives.

Each museum serves a distinct audience, resulting in diverse needs, communication strategies, and visitor preferences across different types of institutions (Acar, 2017). Within the museum's articulated vision framework, two key communication parameters—target audience and resource allocation—warrant careful consideration throughout the museum design process (Acar, 2017). Considering these

factors and aligned with the objectives of the present study, it was deemed appropriate to base the design on the perspectives and recommendations of pre-service mathematics teachers.

The design priorities identified by pre-service teachers for a mathematics museum correspond closely with the defining features of interactive museums. Such museums aim to provide visitors with memorable experiences by conveying the narratives of exhibited objects, situating them within their historical and intellectual context, and fostering critical thinking, analytical reasoning, and interpretative skills. Acar (2017) asserts that the incorporation of interactive design elements constitutes one of the most effective strategies for facilitating active learning. Given the similarities between the target audiences of science and mathematics museums, interactive technological spaces are commonly employed in these institutions to satisfy visitors' inherent expectations. Within these technologically enhanced, interactive environments, tools such as simulators, virtual reality applications, and 3D printers are utilized to engage visitors with the central subject matter (Uysal, 2013). In the present study, the panorama and simulation hall designed based on pre-service teachers' recommendations exemplifies this approach (see Figure 1).

Analysis of pre-service teachers' recommendations indicates that they perceive learning environments enabling students to engage in direct, hands-on interactions and to learn mathematics through active participation as conducive to enjoyable and enduring learning. This finding is consistent with the results reported by Hamurcu et al. (2007), Dumont et al. (2025), and Casi and Sabena (2024). Accordingly, mathematics museums are expected to provide multidimensional benefits enhancing students' academic achievement and fostering positive attitudes toward learning and supporting the application of mathematical concepts to real-life contexts. Evidence from the literature on informal learning environments, which underscores their role in developing problem-solving, critical thinking, and mathematical creativity skills, further corroborates the findings of the present study (Zoldosova & Prokop, 2006; Rennie et al., 2003).

Recommendations

- ✓ Pre-service teachers could receive targeted training on how to effectively integrate museums into mathematics education. Additionally, since mathematics museums remain relatively unfamiliar to many teacher candidates, introductory orientation sessions, and informational brochures and posters could be provided to increase their awareness and understanding.
- ✓ The position of museum education courses, currently offered as elective subjects within teacher education programs, could be critically examined. If deemed necessary, such courses may be transitioned from elective to compulsory status and incorporated as mandatory components within the undergraduate curriculum of education faculties.
- ✓ Pre-service teachers who enroll in museum education courses could be provided with opportunities to engage in practical, hands-on activities within museums during their undergraduate studies.
- ✓ Insights from pre-service teachers, along with evidence from the literature, suggest that the number of mathematics museums in Turkey remains insufficient. Therefore, the development of additional mathematics museums as out-of-school learning environments is strongly recommended.
- ✓ Informed by the recommendations of pre-service teachers, mathematics museums can be designed to provide engaging and enjoyable experiences for visitors. To maintain their ongoing development and ensure relevance, museums should also administer visitor evaluation surveys.
- ✓ Pre-service teachers highlighted the significance of fostering collaboration between schools and museums, alongside ensuring sufficient guides to support visitors. These strategies are anticipated to enhance both the functionality and overall effectiveness of mathematics museums.

- ✓ Research integrating museums into mathematics education in Turkey remains scarce (Aydoğdu et al., 2022). Expanding the body of research on mathematics museums as out-of-school learning environments is recommended, with an emphasis on examining diverse and contemporary aspects of the subject.
- ✓ The insights and recommendations of mathematics educators should inform the design of mathematics and science museums.

Ethics and Conflict of Interest
This research was conducted with the permission obtained from the Ethics Committee of Dokuz Eylül University Legal Counsel, dated 06.01.2022 and numbered E-87347630-659-173775. The authors declare that they acted in accordance with ethical rules in all processes of the research. The authors declare that they have no conflict of interest.

Author Contribution
All authors contributed equally to the research.

Data availability
The data that support the findings of this study are available on request from the corresponding author.

Corresponding Author
Correspondence to Sekan NARLI, serkan.narli@deu.edu.tr

REFERENCES

Acar, A. (2017). Müze ve sergilemelerde etkileşimli tasarım çözümleriyle bilgiyi görselleştirmek [Visualizing information with interactive design solutions in museums and exhibitions]. *Sanat Yazıları*, 36, 139-155.

Akman, B., Özen Altınkaynak, Ş., Ertürk Kara, H. G., & Can Gül, Ş. (2015). Okul öncesi öğretmenlerinin müze eğitimine ilişkin görüşleri [Preschool teachers' opinions on museum education]. *Journal of Uludag University Faculty of Education*, 28(1), 97-115. https://doi.org/10.19171/uuefd.49876

Altun, M. (2006). Matematik öğretiminde gelişmeler [Developments in mathematics teaching]. *Journal of Uludag University Faculty of Education*, 19(2), 223-238.

Andre, L., Durksen, T., & Volman, M. L. (2017). Museums as avenues of learning for children: A decade of research. *Learning Environments Research, 20*(1), 47–76. https://doi.org/10.1007/s10984-016-9222-9

Aydoğdu, A. S., Aydoğdu, M. Z., & Aktaş, V. (2022). Matematik dersinde bir eğitim aracı olarak sanal müze kullanımı [The use of virtual museums as an educational tool in mathematics lessons]. *International Journal of Social Science Research, 11*(1), 51-70.

Aydoğdu, A. S., Aydoğdu, M. Z., & Aktaş, V. (2023). Okul dışı öğrenme ortamlarıyla ilgili matematik öğretmenlerinin görüşleri [Mathematics teachers' opinions on out-of-school learning environments]. *Buca Faculty of Education Journal*, (55), 60-78. https://doi.org/10.53444/deubefd.1171301

Aydoğdu, M. Z., & Aydoğdu, A. S. (2025). Okul dışı öğrenme ortamlarında problem kurma: Matematik öğretmen adaylarının sürece yönelik değerlendirmeleri [Problem posing in out-of-school learning environments: Pre-service mathematics teachers' evaluations of the process]. *Abant Izzet Baysal University Journal of Faculty of Education (BAIBUEFD), 25*(2), 1103–1120. https://doi.org/10.17240/aibuefd.2025..-1552149

Bahadır, E., & Hırdıç, K. (2018). Matematik müzesinde yürütülen öğrenme etkinliklerinin öğrencilerin matematikleştirme sürecine katkıları ve uygulama hakkında öğrenci görüşleri [Contributions of learning activities in mathematics museum to students' mathematization process and student opinions on implementation]. *Turkish Studies Social Sciences, 13*(26), 151-172. http://dx.doi.org/10.7827/TurkishStudies.14598

Binekci, Ö. (2023). A bibliographic study on current research in the field of museum education in Türkiye. *Journal of International Museum Education*, 5(Special Issue), 175-184.

Buchholtz, N. (2023). *Technology-enhanced mathematics trails for out-of-school learning of the application of mathematics*. In Technology integration and transformation in STEM classrooms (pp. 147–164). IGI Global.

Buyurgan, S. (2019). *Öğrenme ortamı olarak müzeler* [Museums as learning environments]. Ankara: Pegem Academy.

Casi, R., & Sabena, C. (2024). Mathematics in art and history museums: An informal mathematics education case for teachers' in-service training. *Education Sciences, 14*(5), 489. https://doi.org/10.3390/educsci14050489

Creswell, J. W. (2021). *Nitel araştırma yöntemleri, beş yaklaşıma göre nitel araştırma ve araştırma deseni* [Qualitative research methods: Research design according to five approaches] (6th ed.; Çev. Ed. S. B. Demir & M. Bütün). Ankara: Siyasal Kitabevi.

Çiçek, Ö., & Saraç, E. (2017). Fen bilimleri öğretmenlerinin okul dışı öğrenme ortamlarındaki yaşantıları ile ilgili görüşleri [Science teachers' opinions on out-of-school learning experiences]. *Ahi Evran University Faculty of Education Journal, 18*(3), 504-522.

Çıldır, Z., & Karadeniz, C. (2017). Okul öncesi öğretmen adaylarının görüşleri bağlamında müze ve müzede eğitim [Museum and museum education in the context of pre-service preschool teachers' opinions]. *Milli Eğitim Dergisi, 46(*214), 359-383.

Demirel, İ. N. (2020). Sınıf eğitimi öğretmen adaylarının müzelerde eğitim uygulamalarına yönelik öz yeterlikleri [Pre-service classroom teachers' self-efficacy regarding museum education practices]. *Abant Izzet Baysal University Journal of Faculty of Education (BAIBUEFD), 20*(1), 585-604. https://doi.org/10.17240/aibuefd.2020.20.52925-635352

Dere, İ., & Gökçınar, B. (2025). Exploring Turkish preservice teachers' perspectives on out-of-school learning environments: benefits, challenges, and educational implications. *Journal of Adventure Education and Outdoor Learning*, 1-20. https://doi.org/10.1080/14729679.2025.2585200

Dumont, C., De Backer, F., Dewinter, H., & Vandermeersche, G. (2025). Museum educators' views on digital museum education: opportunities and challenges. *Cultural Trends, 34*(3), 398-413. https://doi.org/10.1080/09548963.2024.2378324

Erbay, F. (2017). Müzelerin eğitim ve tasarım atölyelerinde informal eğitim [Informal education in museum and design workshops]. *Milli Eğitim Dergisi, 46*(214), 239–253.

Erbay, M. (2017). Education in museums with next generation technologies. *Milli Eğitim Dergisi, 46*(214), 255–268.

Erem, E. (2019). Sınıf öğretmeni adaylarının seçmeli müze eğitimi dersine ilişkin görüşleri [Pre-service classroom teachers' opinions on elective museum education course] (Unpublished Master's Thesis). Pamukkale University.

Ertaş, H. (2012). The effects of critical thinking education supported by out-of-school activities on critical thinking disposition and attitude toward physics course. *Education and Science, 39*(176), 13–30.

Eshach, H. (2007). Bridging in-school and out-of-school learning: Formal, non-formal, and informal education. *Journal of Science Education and Technology, 16*(2), 171–190. https://doi.org/10.1007/s10956-006-9027-1

Govekar-Okoliš, M. (2018). Effectiveness of school lessons from the past as living forms of museum education for university students. *Museum Management and Curatorship, 33*(4), 382–397. https://doi.org/10.1080/09647775.2018.1490198

Göğebakan, Y. (2018). Alternatif öğrenme mekanları olarak müzelerin eğitim-öğretimde kullanılmasının önemi [The importance of using museums as alternative learning spaces in education]. *Journal of the Fine Arts Institute (GSED),* (40), 9–41.

Guardino, C., Hall, K. W., Largo-Wight, E., & Hubbuch, C. (2019). Teacher and student perceptions of an outdoor classroom. *Journal of Outdoor and Environmental Education, 22*(2), 113–126. https://doi.org/10.1007/s42322-019-00033-7

Gürbey, Z. B., Efe, H., & Mertoğlu, H. (2020). Fen bilgisi öğretmen adaylarının okul dışı öğrenme kapsamında müze eğitimine ilişkin görüşleri [Pre-service science teachers' opinions on museum education in out-of-school learning]. *Journal of Sustainable Educational Studies (JSES), 1*(1), 13–25.

Hamurcu, H., Girgin, D., & Özyılmaz Akamca, G. (2007). Fen ve teknoloji öğretiminde müzelerden yararlanıyor muyuz: Öğretmenlerin ve öğretmen adaylarının görüşleri [Do we benefit from museums in science and technology education: Opinions of teachers and pre-service teachers]. In *Anadolu Üniversitesi VI. Ulusal Sınıf Öğretmenliği Eğitimi Sempozyumu* (pp. 31–38). Eskişehir: Nobel Publishing.

Haji, S., Yumiati, Y., & Zamzaili, Z. (2019). Improving students' productive disposition through realistic mathematics education with outdoor approach. *JRAMathEdu (Journal of Research and Advances in Mathematics Education), 4*(2), 101–111.

Hein, G. E. (1998). *Learning in the museum*. Routledge.

Holmes, J. A. (2011). Informal learning: Student achievement and motivation in science through museum-based learning. *Learning Environments Research, 14*, 263–277. https://doi.org/10.1007/s10984-011-9094-y

İlhan, G., Tokmak, A., & Aktaş, V. (2021). Virtual museum experiences of social studies teacher candidates. *Journal of International Museum Education, 3*, 74–93. https://doi.org/10.51637/jimuseumed.958918

İnce, S., & Akcanca, N. (2021). Okul öncesi eğitimde okul dışı öğrenme ortamlarına yönelik ebeveyn görüşleri [Parents' opinions on out-of-school learning environments in preschool education]. *Mehmet Akif Ersoy University Journal of Education Faculty, 58*, 172–197. https://doi.org/10.30798/maeuefd.886446

Karakaş, S. (2020). Education in science and technology museums. *Journal of International Museum Education, 2*(1), 62-78.

Kaya, R., & Okumuş, O. (2018). Sanal müzelerin tarih derslerinde kullanımının öğrenci görüşlerine göre değerlendirilmesi [Evaluation of virtual museums' use in history classes according to student opinions]. *Turkish History Education Journal, 7*(1), 113–153. https://doi.org/10.17497/tuhed.397476

Kayhan Altay, M., & Yetkin Özdemir, E. (2023). The use of museum resources in mathematics education: A study with preservice middle school mathematics teachers. *Journal of Education for Teaching, 49*(4), 616–629. https://doi.org/10.1080/02607476.2022.2150534

Kır, H., Kalfaoğlu, M., & Aksu, H. H. (2021). Mathematics teachers' opinions on the use of out-of-school learning. *International Journal of Educational Studies in Mathematics, 8*(1), 59–76. https://doi.org/10.17278/ijesim.839925

Kisida, B., Bowen, D. H., & Greene, J. P. (2016). Measuring critical thinking: Results from an art museum field trip experiment. *Journal of Research on Educational Effectiveness, 9*(sup1), 171–187. https://doi.org/10.1080/19345747.2015.1086915

Kolb, D. A. (1984). *Experiential learning: Experience as the source of learning and development*. Prentice Hall.

Körükcü, M. (2019). Değişen müze eğitimi algısı çerçevesinde sosyal bilgiler ve tarih öğretmen adaylarının müze eğitimine yönelik özyeterlik inançları [Self-efficacy beliefs of social studies and history teacher candidates within the context of changing museum education perceptions]. *Trakya University Journal of Social Science, 21*(2), 759–771. https://doi.org/10.26468/trakyasobed.542284

Krippendorff, K. (2019). *Content analysis: An introduction to its methodology* (4th ed.). SAGE.

Kuruoğlu Maccario, N. (2002). Müzelerin eğitim ortamı olarak kullanımı [Use of museums as educational environments]. *Journal of Uludag University Faculty of Education, 15*(1), 275–285.

Kuş, M. (2024). Conceptualization of out-of-school mathematics education. *Journal of Education for Life, 38*(1), 245–257. https://doi.org/10.33308/26674874.2024381644

Merriam, S. B., & Tisdell, E. J. (2016). *Qualitative research: A guide to design and implementation* (4th ed.). Jossey-Bass.

Mettis, K., Väljataga, T., & Uus, Õ. (2023). Mobile outdoor learning effect on students' conceptual change and transformative experience. *Technology, Knowledge and Learning, 28*(2), 705–726.

Neu, R. E. (1985). Can an art museum teach math and history? *National Art Education Association, 40*(6), 19–21. https://www.jstor.org/stable/3192888

Okvuran, A., & Karadeniz, C. (2022). Teacher's impact on museum education and design of new-generation school and museum collaboration in Turkey. *Museum Management and Curatorship, 37*(1), 17–43. https://doi.org/10.1080/09647775.2021.1914138

Önder, A., Abacı, O., & Kamaraj, I. (2009). Müzelerin eğitim amaçlı kullanımı projesi: İstanbul Arkeoloji Müzesi'ndeki Marmara örneklemi [Project on educational use of museums: Marmara sample from Istanbul Archaeology Museum]. *Pamukkale University Journal of Education, 25*(25), 103–117.

Patton, M. Q. (2014). *Nitel araştırma ve değerlendirme yöntemleri* [Qualitative research and evaluation methods] (M. Bütün & S. B. Demir, Çev.). Pegem Academy.

Rennie, L. J., Feher, E., Dierking, L. D., & Falk, J. H. (2003). Toward an agenda for advancing research on science learning in out-of-school settings. *Journal of Research in Science Teaching, 40*(2), 112–120. https://doi.org/10.1002/tea.10067

Roldán-Zafra, J., & Perea, C. (2022). Math learning in a science museum—Proposal for a workshop design based on STEAM strategy to learn mathematics: The case of the cryptography workshop. *Mathematics, 10*(22), Article 4335. https://doi.org/10.3390/math10224335

Saraç, H. (2017). Türkiye'de okul dışı öğrenme ortamlarına ilişkin yapılan araştırmalar: İçerik analizi çalışması [Research on out-of-school learning environments in Turkey: A content analysis study]. *Journal of Education, Theory and Practical Research, 3*(2), 60–81.

Seligmann, T. (2015, November 2). Learning museum: A meeting place for pre-service teachers and museums. *Journal of Museum Education, 39*(1), 42–53.

Sezgin Özrili, A., & Özrili, Y. (2021). Interactive exhibition applications in museums. *Inönü University Journal of Art and Design, 11*(24), 86–102.

Swanson, D., & Williams, J. (2014). Making abstract mathematics concrete in and out of school. *Educational Studies in Mathematics, 86*(2), 193–209. https://doi.org/10.1007/s10649-014-9536-4

Tanrıöğen, A. (2014). *Bilimsel araştırma yöntemleri* [Scientific research methods]. Anı Publishing.

Usta, N., Gürçay, S., Sakioğlu, Ş., & Demir, F. (2023). Okul dışı öğrenme ortamı uygulamalarının öğrencilerin matematik başarılarına etkisi ve uygulamaya ilişkin görüşleri [The effects of out-of-school learning environment practices on students' mathematics achievement and their opinions on the implementation]. *Yaşadıkça Eğitim, 37*(3), 711-733. https://doi.org/10.33308/26674874.2023373593

Uysal, M. (2013). *Müze tasarımında ortaya çıkan kriterler* [Criteria emerging in museum design] (Unpublished master's thesis). Gazi University.

Waite, S., & Aronsson, J. (2022). Some impacts on health and wellbeing from school-based outdoor learning. In R. Jucker & J. von Au (Eds.), *High-quality outdoor learning: Evidence-based education outside the classroom for children, teachers and society* (pp. 171–190). Springer Nature. https://doi.org/10.1007/978-3-031-04108-2

Yıldırım, A., & Şimşek, H. (2016). *Sosyal bilimlerde nitel araştırma yöntemleri* [Qualitative research methods in social sciences]. Seçkin Publishing.

Yıldırım, A., & Şimşek, H. (2021). *Sosyal bilimlerde nitel araştırma yöntemleri* [Qualitative research methods in social sciences] (Rev. ed.). Seçkin Publishing.

Yıldız, C., & Göl, R. (2014). Matematik derslerinde sınıf dışı etkinliklerin kullanımı [Use of out-of-class activities in mathematics lessons]. *Journal of Research in Education and Teaching, 3*(1), 85–94.

Yılmaz, A. (1996). *Müzelerde çocuk eğitiminin müze koleksiyonları bağlamında değerlendirilmesi ve Rahmi M. Koç Sanayi Müzesi örneğinde irdelenmesi* [Evaluation of children's education in museums in the context of museum collections: The case of Rahmi M. Koç Industrial Museum] (Unpublished master's thesis). Yıldız Technical University.

Yıldırım, E. (2017). Müzelerin eğitimde kullanımına yönelik sınıf öğretmeni adaylarının görüşleri [Pre-service classroom teachers' opinions on the use of museums in education]. *HAYEF: Journal of Education, 14*(2), 113–129. https://doi.org/10.26650/hayef.2017.14.2.0012

Yurd, M., & Varnacı Uzun, F. (2024). Müze eğitimi projesine katılan öğrencilerin müze eğitimine ilişkin farkındalık düzeylerinin ve görüşlerinin değerlendirilmesi [Evaluation of students' awareness and opinions regarding museum education in a museum education project]. *Buca Faculty of Education Journal, (60),* 913–930. https://doi.org/10.53444/deubefd.1335657

Zoldosova, K., & Prokop, P. (2006). Education in the field influences children's ideas and interest toward science. *Journal of Science Education and Technology, 15*(3–4), 304–313.

About the authors:

Kübra SEVİMLİ, MSc
Kübra Sevimli completed her undergraduate degree with high honors in Elementary Mathematics Education at Dokuz Eylül University, Buca Faculty of Education. She is currently pursuing a master's degree in mathematics education at the Institute of Educational Sciences, Dokuz Eylül University. Her research interests include mathematics education for gifted students, geometry teaching and geometric thinking, statistical thinking, mathematical modeling, artificial intelligence in mathematics education, mobile learning, and out-of-school learning. She has contributed to several TÜBİTAK-funded projects and presented at conferences and published scholarly works in these areas.

Hacer AKSAKAL
Hacer Aksakal graduated in 2023 from Dokuz Eylül University Faculty of Education, Department of Primary Education Mathematics Teaching, ranking first in her department and second in the faculty, with highest honors. She participated in a TÜBİTAK-funded project on Mathematics and out-of-school learning environments. She currently works as a mathematics teacher, focusing on student-centered teaching and supporting students learning processes with special needs.

Serkan NARLI, Prof. Dr.
He completed his master's and doctoral education at the Department of Mathematics Education, Faculty of Education, Dokuz Eylül University, Buca. He is currently an academic member at the Department of Mathematics Education, Faculty of Education, Dokuz Eylül University. Within the university, he teaches undergraduate and graduate-level courses designed to educate and prepare future mathematics teachers and researchers. His research areas include teacher education, data mining, mathematics mobile applications, and mathematics teacher education approaches. In this context, he conducts numerous local and national studies.

Kamile US
Kamile Us completed her undergraduate studies in Architecture at the Faculty of Architecture, Izmir Democracy University, graduating with honors. During her academic and internship training, she designed and developed various projects, including urban design projects, hotel and congress center complexes, nurseries, museums, art centers, residential buildings, and football stadiums, for which she also produced renderings and undertook supervision during implementation. She has participated in several professional training programs in the field of architecture. She is currently working at a building inspection firm, where she is responsible for project and construction supervision.

IOJPE
ISSN: 1300 – 915X
www.iojpe.org
International Online Journal of Primary Education 2025, volume 14, issue 4

APPENDIX 1.

INTERVIEW FORM ON THE INTEGRATION OF MUSEUMS INTO MATHEMATICS EDUCATION

This form seeks to collect pre-service elementary mathematics teachers' views on museum education and their perspectives on integrating museums into mathematics education. The information obtained will be used within the scope of the TÜBİTAK 2209-A research project. The form consists of nine open-ended questions and is expected to take approximately 30 minutes to complete. After carefully reading each question, you are kindly asked to provide responses reflecting your views. Please ensure that no questions are left unanswered. We sincerely thank you for your voluntary participation in this study.

Questions:

1. What does the concept of a museum evoke for you, and what kind of place comes to mind when you think of a museum?
2. Have you previously participated in any educational activities conducted in a museum setting?
   a) How frequently do you visit museums?
   b) What types of museums have you visited? Please specify.
3. In your opinion, for what purposes can individuals visit museums?
4. In your opinion, can museums be considered as out-of-school learning environments? If so, what types of educational activities might they be utilized for? Please elaborate.
5. Have you previously participated in any educational activities conducted in a museum setting?
6. In your opinion, could there be a relationship between the concepts of mathematics and museums? Please explain.
7. In your opinion, is it possible to utilize museums in mathematics education? Please explain.
8. Do you have any suggestions for integrating museums into mathematics education?
9. What aspects would you consider if you were to design a mathematics museum?

IOJPE

ISSN: 1300 – 915X
www.iojpe.org

International Online Journal of Primary Education *2025, volume 14, issue 4*

IMPACT OF TRADITIONAL GAMES ON CRITICAL AND CREATIVE THINKING IN PRIMARY SCHOOL STUDENTS: A QUASI-EXPERIMENTAL MIXED-METHODS STUDY

Suna UTAR ÖZKAN
Assist. Prof. Dr., Gaziantep Islam Science and Technology University,
Faculty of Economics & Social Sciences, Turkey
ORCID: https://orcid.org/0000-0002-3246-039X
suna.ozkan@gibtu.edu.tr

Sevilay ŞAHİN
Prof. Dr., Gaziantep University, Department of Educational Sciences, Turkey
ORCID: https://orcid.org/0000-0002-7140-821X
ssahin@gantep.edu.tr

Zarife PANCAR
Assoc. Prof. Dr., Gaziantep University, Faculty of Sport Sciences, Turkey
ORCID: https://orcid.org/0000-0002-1659-2157
zarifepancar@gantep.edu.tr

Received: September 9, 2025 **Accepted:** December 21, 2025 **Published:** December 31, 2025

Suggested Citation:
Utar Özkan, S., Şahin, S., & Pancar, Z. (2025). Impact of traditional games on critical and creative thinking in primary school students: A quasi-experimental mixed-methods study. *International Online Journal of Primary Education (IOJPE), 14*(4), 239-261. https://doi.org/10.55020/iojpe.1780729

Abstract

This study explores the influence of traditional Turkish games on the development of creative and critical thinking in primary school students. These traditional games, now at risk of disappearing, may hold untapped educational potential. Using an exploratory sequential mixed-methods design, interviews with 12 primary school teachers identified themes indicating that such games foster critical thinking, analytical ability, mathematical reasoning, creativity, confidence, teamwork, and strategic planning. These qualitative insights guided a quasi-experimental study with 79 fourth-grade students: an experimental group (39 students engaged in traditional games) and a control group (40 students with regular activities). The intervention involved 40-minute sessions, four days a week for eight weeks. Pretest scores showed no significant differences between groups, but posttests revealed marked improvements in the experimental group. These results suggest that integrating traditional games into classroom settings can be an effective alternative to conventional teaching for promoting critical thinking.

Keywords: Traditional games, critical thinking, creative thinking, play-based learning.

INTRODUCTION

The pedagogical strategies used within the Turkish primary education system reveal a dominant focus on silent observation, memorisation, frequent testing, and restrictions on social interaction and recreational activities, with particular emphasis on multiple-choice assessments. In some schools, students spend more than 8 hours a day indoors to enhance their academic skills. This approach relies on the belief that rigorous pedagogical methods—such as silent individual study and regular assessments—will improve academic achievement and help secure a more promising future for children.

However, reports by OECD (2019) and UNESCO (2021) emphasise the importance of children acquiring cognitive, problem-solving, social-emotional, and transformative skills by 2030. These skills cannot be effectively developed through rote memorisation, individual study or multiple-choice assessments alone. Instead, play-based learning emerges as a crucial pedagogical approach, fostering

cooperation, analytical reasoning, and inference, thus supporting the development of cognitive and social abilities vital for success in the 2030s. Studies (Yılmaz & Griffiths, 2023; Lee et al., 2020) show that games offer benefits beyond mere entertainment, functioning as tools for enhancing physical, emotional, social, and cognitive growth. Given the decline of traditional games, there is potential to reintroduce them as valuable alternatives to the dominant, outdated educational methods prevalent in Turkey.

Children gain many benefits from participating in games beyond simple entertainment. The idea of 'tradition' relates to customs passed down through generations, highlighting the importance of preserving cultural heritage and maintaining traditional practices (Adorno, 1992). In this context, traditional games can help sustain cultural identity and improve cognitive skills, especially in an era where learners are immersed in digital educational environments (Nussbaum, 2010).

Although traditional games may confer cognitive benefits, empirical research on their impact on cognitive skills remains limited (Vygotsky, 1978). Yılmaz and Griffiths (2023) conducted a study on children's problem-solving abilities through games, finding that nearly all studies published between 2000 and 2019 reported positive effects of both video and traditional games on students' problem-solving skills. However, research specifically focused on traditional games remains limited, with only three studies examining their effects. Despite growing recognition of the value of game-based learning (Fung & Chung, 2025; Aiono, 2020), most research has concentrated on digital or structured games (Passos et al., 2024; Rosli & Saleh, 2022). Empirical evidence on the cognitive demands and interactional dynamics of traditional games is limited (Yılmaz & Griffiths, 2023; Lestariningrum, 2017; Petrovska et al., 2013). Therefore, this study aims to address this gap by developing a framework that links traditional games to critical and creative thinking.

Purpose and Research Questions

This study investigates the effect of traditional Turkish games on the critical and creative thinking skills of children aged 9-11. The study unfolds in two phases: The study design is illustrated in Figure 1 below.

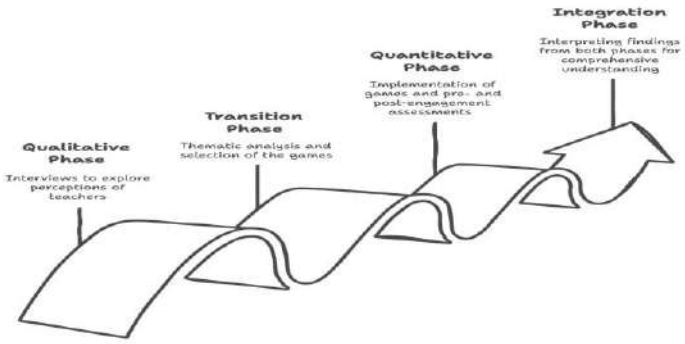


Figure 1. The study design.

To guide this research, the following questions were formulated :

1. Could traditional games (Mule Stake, Dwarf Hall, Zırdır Zımba, Arab Hair, Hadgirchief Grap) contribute to the development of critical thinking skills? If so, in what ways?
2. Does an eight-week traditional game intervention enhance children's critical thinking compared to a non-intervention control group (as measured by the Creative Thinking Task for Children scale)?

Literature Review

Critical Thinking & Play

Critical thinking (CT) is fundamental to effectively addressing the challenges inherent in contemporary society and achieving academic success. Rather than simply accumulating knowledge,

CT emphasises understanding the processes behind knowledge creation.—how information is generated, supported, and evaluated. This approach underscores the importance of gathering evidence to either substantiate or challenge the validity of presented information or knowledge (Hudgins & Delman, 1986).

Critical thinking involves analysing, evaluating, and synthesising information systematically. It's essential for problem-solving and decision-making, vital for academic and life success. Developing this skill helps navigate complex situations by encouraging questioning, responsibility, and cognitive growth. See Table 1 for critical thinking and sub-skills.

Table 1. Core critical thinking skills and their sub-skills.

Core Skill	Definition	Key Sub-skills	Example
1. Interpretation	Understanding and communicating the significance of experiences or information.	Categorizing, decoding significance, clarifying meaning	Clarifying what a chart or statement means.
2. Analysis	Recognising connections between statements, questions, and concepts	Examining ideas, detecting and analyzing arguments	Distinguishing main ideas from supporting evidence.
3. Evaluation	Assessing the credibility of sources and the strength of arguments strength.	Assessing credibility, judging reasoning strength	Determining if conclusions follow logically from data.
4. Inference	Making conclusions and developing hypotheses based on relevant information.	Querying evidence, conjecturing alternatives, drawing conclusions	Predicting likely outcomes from available evidence.
5. Explanation	Expressing and explaining one's reasoning clearly and convincingly logically.	Stating results, justifying procedures, presenting arguments	Explaining the rationale behind a decision.
6. Self-Regulation	Monitoring and adjusting one's cognitive processes and beliefs.	Self-examination, self-correction	Revising one's opinion when presented with new evidence.

(Adapted from Facione, 2011, p. 9)

CT skills can be developed through interactive learning environments and techniques like Socratic questioning, visualisation tools, simulations, and game-based activities (Daniel & Auriac, 2011; Gelder, 2001). However, the role of games and play in developing these competencies, especially among children, remains underexplored in the literature. Play, by broadening children's perspectives and stimulating creativity, is known to support cognitive development and problem-solving (Devecioğlu & Karadağ, 2016). According to Bruner (1996), adapting play to educational settings can bridge cultural traditions and contemporary learning goals. Traditional games, in particular, encourage flexible problem-solving, perspective-taking, and critical thinking.

Critical thinking skills enable individuals to analyse, evaluate, and make decisions based on evidence and reasoning. These skills are essential for fostering independence and creativity in learners, helping them understand and address the complex issues of today's world (Alsaleh, 2020). Facione's (1990) taxonomy identifies six essential skills that constitute critical thinking: 1) interpretation (clarifying meaning and categorisation), 2) analysis (examining ideas, identifying arguments, and scrutinising reasoning), 3) evaluation (assessing claims and arguments critically), 4) inference (querying evidence, considering alternatives, and drawing informed conclusions), 5) explanation (articulating results, justifying procedures, and presenting coherent arguments), and 6) self-regulation (conducting self-examinations and implementing self-corrections). Moreover, problem-solving is an integral aspect of critical and creative thinking.

The relevant literature highlights that critical thinking can be improved through interactive learning platforms, Socratic questioning, visualisation tools, simulations, and games (Gelder, 2001). The

research also suggests that play may improve children's critical and creative thinking (Fung & Chung, 2025; Aiono, 2020). Incorporating playful strategies in classroom settings, such as games and dialogic interactions, may offer valuable resources for addressing emotional distress and increasing creativity (Sebastián et al., 2025). Samuelsson (2025) emphasises that blending imagination, play, cultural knowledge, and factual information can enhance teaching methods and support children's learning. A pedagogy that promotes learning through play and beyond makes a significant contribution to children's education (Magnusson, 2024). In this context, play-based learning strategies can help children develop skills and attitudes that empower them to become problem solvers and to imagine and create new ideas.

Traditional Games

Several studies highlight the beneficial effects of culturally embedded games across a range of developmental domains, including physical, social, and cognitive skills (Lestariningrum, 2017; Petrovska et al., 2013). Traditional games, transmitted across generations, serve not only as sources of entertainment but also as mechanisms that facilitate socialisation, promote physical activity, and enhance cognitive development (Huizinga, 1955; Rogoff, 2003). In contrast to modern digital games that often emphasise rapid response times and reflexive actions, traditional games prioritise strategic thinking, anticipation, decision-making, and the iterative refinement of strategies (Gee, 2003).

Regarding traditional Turkish games, such as "Mule Pile" and "Dwarf Hall," these activities necessitate strategy and planning, thereby promoting decision-making skills and the exploration of alternative solutions (Özdemir, 2006). Furthermore, games like "Zırdır Zımba" and "Arab Hair" help develop decision-making and strategic thinking skills. These games incorporate elements that support both physical and cognitive development. For this study, five traditional Turkish games at risk of fading away were chosen, each briefly discussed below.

Mule Stake (Katır kazığı)

The mule stake is a traditional Turkish game where one player, the mule, tries to tag others who are attempting to retrieve objects from a circle. A rope tied to a wood piece at the circle's centre limits the mule's movement. As the other players aim to collect their belongings without being caught, they must strategise and evaluate their moves. Figure 2 illustrates the game's structure and interactions.

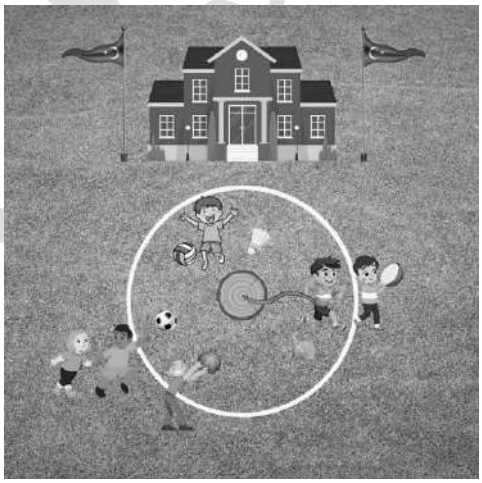


Figure 2. Mule stake game.

The Mule Stake Game encourages children to analyse situations and make logical decisions, enhancing their problem-solving and decision-making skills. It promotes communication and cooperation among players, which may foster critical thinking through strategy discussions. Since it can be played both indoors and outdoors, players can adapt their strategies to different environments.

Dwarf Holl Game (Cüce Höl)

The game involves a straight line and a circular line opposite each other. The goal is for a chosen player to place a target tile before other players reach the line, while the others try to hit it to escape. Players must plan strategies, communicate effectively, cooperate, think critically, and adapt to their surroundings in this open-field game.

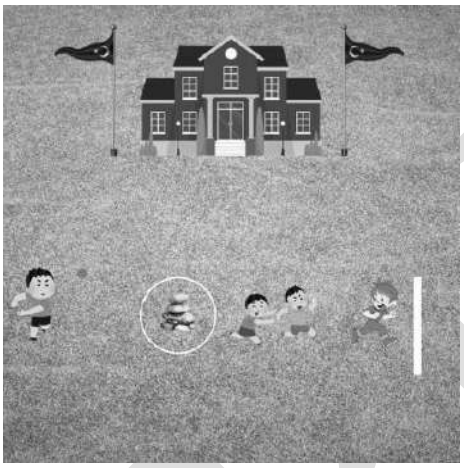


Figure 3. Dwarf holl game.

In this game, children must develop strategies to hit the target by throwing stones. The game may develop children's hand-eye coordination and support their ability to think and move towards the target. This process emphasises focusing, planning and evaluation skills. In addition, evaluating each shot's results and developing strategies for the next shot may improve children's ability to learn from feedback.

Zırdır Zımba

The game involves eliminating players by touching them outside a circle. The chosen player can only exit the circle by hopping on one foot and attempting to tip the others. Another way to tip off the others is to ask riddles to the players. Other players use strategies like hiding or running away to avoid being caught. Figure 4 shows the game.

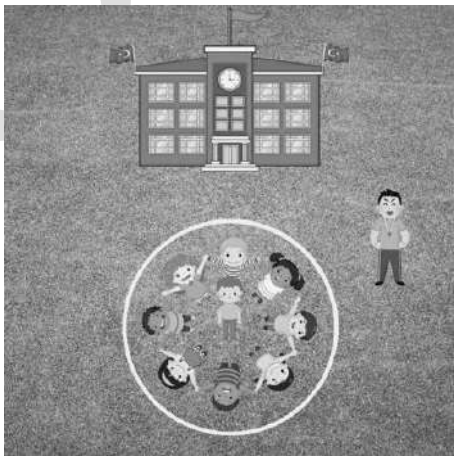


Figure 4. Zırdır zımba game.

Acting in a limited space enhances children's flexibility and adaptability. Zırdır Zımba is a game that integrates physical and cognitive skills. The selected player, moving on one leg, must make strategic decisions and analyse opponents to succeed. This game may develop logical thinking and analytical

skills, while predicting others' moves strengthens foresight. Players evaluate their options and must think critically to anticipate and adjust strategies effectively.

Arab Hair (Arap Saçı)

The Arab hair game involves 5 or 6 players who create a spider web with string and work together to unravel it. Usually played indoors, it can also be enjoyed outdoors in gardens during spring and summer. See Figure 5.

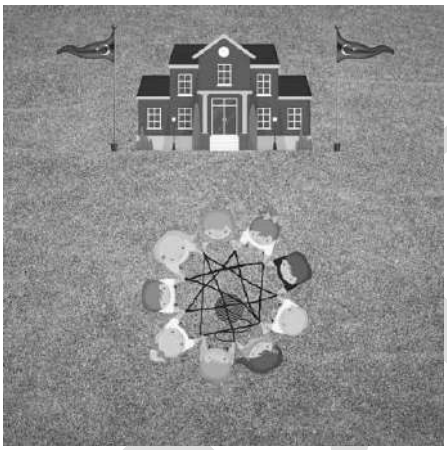


Figure 5. Arab hair game.

This game may enhance children's memory, attention, and strategic thinking skills. Players must recall and plan the sequence to untie the rope knots, fostering observation and logical analysis. It may also encourage focus and analytical thinking by reviewing past moves while promoting teamwork and collaborative problem-solving.

Handkerchief Grab (Mendil Kapmaca)

The game involves two groups. Players opposite each other try to grab a handkerchief from the referee and return to their seats without being caught.

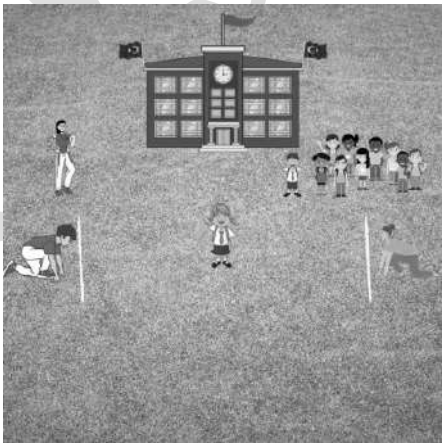


Figure 6. Handkerchief Grab Game.

It can be played indoors or outdoors, with an equal players in each group, as shown in Figure 6.

METHOD

Research Model

This study employed an exploratory sequential mixed-methods design, which is particularly appropriate when the research aims first to explore a phenomenon in-depth through qualitative

inquiry and then to test a hypothesis based on the quantitative findings (Creswell & Plano Clark, 2017).

1. Qualitative Phase: Semi-structured interviews with 12 experienced primary school teachers in two settings identified core themes regarding games' potential impact on critical and creative thinking subskills. Content analysis was conducted, and both member checking and peer debriefing supported the credibility and reliability of the study.

2. Quantitative Phase: Informed by focus group results, a quasi-experimental, pretest-posttest, control group design was implemented, with 79 fourth-grade students. The experimental group of 39 participants played traditional games during class hours, while the 40 in the control group continued with regular activities.

The integration of qualitative and quantitative phases occurred at the interpretation stage. Qualitative findings were used to select the games to be implemented, and the quantitative results helped validate and extend the initial qualitative insights (Creswell & Plano Clark, 2017). This sequential approach enabled a deeper and more comprehensive understanding of the role of traditional games in enhancing critical thinking skills in the elementary school context. This approach improves the reliability of results by utilising data from multiple sources, minimising biases, and providing a clearer understanding of the findings (Johnson et al., 2007; Tashakkori & Teddlie, 2010).

Part I: Qualitative Research Design

Data Collection Tool

Özden Gürbüz's (2016) study examines 25 traditional children's games in Turkey, highlighting their potential to enhance cognitive skills, including problem-solving and critical thinking. For this research, five games—Mule Stake, Zırdır Zımba, Cüce Hol, Handkerchief Grab, and Arab Hair—were selected through consultations with sports experts and academics to investigate their potential effectiveness in promoting creative and critical thinking.

For data collection, we developed an initial version of the qualitative interview form after reviewing the literature on traditional games and cognitive thinking skills. We sought feedback on its content and readability from two field professors, which ultimately led to the development of the final semi-structured data collection interview form.

In the semi-structured interview form, the questions focused on two main concerns: (1) whether the presented games could enhance children's critical thinking skills, and if so, which specific sub-skills are influenced; and (2) the feasibility of implementing these games in a classroom setting.

Data Collection Process

Researchers conducted focus group interviews in two settings. First, they outlined core thinking skills and introduced five games—Mule Stake, Zırdır Zımba, Cüce Hol, Handkerchief Grab, and Arab Hair—with illustrations and rules, without hinting at expected outcomes. The participants were then interviewed using the form. Each session was recorded, transcribed, and analysed to identify themes related to the games' effectiveness.

Participants

Twelve elementary school teachers with experience in teaching critical thinking and incorporating games were purposively selected for focus group interviews. Selection criteria included seniority, willingness, and permanent status. All participants consented voluntarily.

Data Analysis

Qualitative data were analysed using NVivo 16. Content analysis was conducted using themes, subthemes, and codes. The themes for the content analysis were developed based on the interview questions that were asked. The dataset was primarily used to determine the codes, which were mostly decided at the paragraph level.

Validity and Reliability Studies

For the credibility of the findings, we employed member checking. After the interviews, we summarised key themes and returned them to participants for verification and potential additions (Mayring, 2014). Additionally, we utilised peer debriefing throughout the research process. Two researchers coded the transcribed data and discussed emerging themes to reduce bias and increase reliability. This ongoing dialogue helped mitigate researcher bias and strengthen the reliability of our findings (Patton, 2002). Additionally, the data triangulation method was utilised, incorporating various methods and data sources (both qualitative and quantitative) to examine the phenomenon. This approach helped to validate the findings and enhance their generalizability (Kenny, 2019).

Trustworthiness

To gather comprehensive data, each interview lasted approximately 90 minutes, enabling in-depth interactions. This extended engagement enhanced the credibility of the research, aligning with the recommendations of Lincoln and Guba (1985). Peer debriefing was also utilised, following the guidance of Hail et al. (2011), by sharing the research findings with an external researcher to identify any potential biases.

Additionally, a member-checking procedure was implemented, allowing participants to verify the accuracy and relevance of the results in relation to their views (Birt et al., 2016). Participants were selected through purposeful sampling to enhance the transferability of the findings (Kemper et al., 2003). In this dependability study (Akkerman et al., 2006), the methodology and results were reviewed by a field expert who audited the data collection and analysis processes. An audit trail was maintained to ensure that the findings were consistent with the collected data, thereby supporting confirmability (Akkerman et al., 2006).

Part II: Quasi-experimental Study

Participants

The study involved 79 fourth-grade children, aged 9 to 11 years. Eight fourth-grade classes at a state school in Gaziantep were selected to complete the Creative Thinking Task for Children (CTTC) scale. Among these, four classes that exhibited no statistically significant differences in the pre-test were randomly assigned to either the experimental or control group, with two classes in each condition. Given the similarity in class size and demographic background, this class-level randomization was employed to enhance comparability between groups and to mitigate selection bias.The experimental group of 39 students played traditional games, while the control group of 40 students continued regular activities.

To maintain environmental consistency, both groups were selected from the same school and experienced similar classroom conditions. The control group received the standard instructional program, while the experimental group participated in traditional games as part of the intervention. Each group's sessions were led by different instructors to prevent the mixing of instructional techniques.

Data Collection Tool

The Creative Thinking Task for Children (CTTC) scale, developed by Tatlı and Artar (2022), was used as both a pre-test and a post-test. The scale consists of 11 items, each scored from 0 to 3, for children. It has a four-factor structure: originality, elaboration, fluency, and divergent thinking.

The scale includes a set of tasks that directly assess children's creative thinking processes. Children demonstrate their creative thinking skills in line with the tasks set. The tasks aim to evaluate children's problem-solving processes, their ability to generate different and new ideas, and their originality. In these tasks, children develop their solutions in line with the given clues or problems, and these solutions are evaluated using criteria such as originality, flexibility, fluency, and elaboration. The total Cronbach Alpha reliability is .67, with sub-dimensions scoring originality .73, elaboration .60, fluency .61, and divergent thinking .69.

CTTC offers a structured method for assessing children's creative thinking, focusing on specific aspects such as fluency, originality, and flexibility. However, it overlooks broader elements like questioning and metacognition. Although the tool demonstrates acceptable reliability and validity, these have primarily been tested within specific cultural and educational contexts, which may limit its generalizability. As a task-based assessment, the CTTC may not fully capture all cognitive processes involved in traditional games. Despite these limitations, it was appropriate for this study due to its alignment with the developmental stage of primary school children's creative thinking, its established scoring system, and its provision of measurable indicators related to targeted creative skills interventions.

Facione (2011) defines critical thinking as purposeful, self-regulatory judgment involving interpretation, analysis, evaluation, inference, and explanation of the considerations behind that judgment. It involves both cognitive skills and dispositions, guiding belief and action toward justifiable conclusions. Facione emphasises that critical thinking is distinct from, but may include, elements of creative thinking. Creativity generates ideas; critical thinking evaluates, clarifies, and justifies them. Paul and Elder (2014) say critical thinking is a disciplined reasoning process that includes creativity, such as imagination, curiosity, and problem formulation. They argue that creativity is essential for critical thinking, helping develop and evaluate new insights. While often treated separately, prior research suggests critical thinking encompasses creative components, such as generating perspectives or solutions before evaluation. Our use of a creative thinking measure was aimed at assessing these subprocesses within critical reasoning.

In the data analysis phase, the scoring process was conducted by two independent researchers who evaluated students' papers using a standardised rubric to ensure consistency across assessments. Each rater independently reviewed all papers, and their scores were subsequently compared. Inter-rater reliability was assessed using Cohen's Kappa to quantify the agreement between the raters. The analysis revealed a Kappa value of .91, indicating a high level of agreement and excellent reliability between the raters (Koo & Li, 2016).

The Intervention: Implementing Games in the Classroom

Selection of Games

Employing a mixed-methods design, the study integrated qualitative (focus group interviews) and quantitative (Quasi-experimental study) components to ensure coherence. The initial qualitative analysis guided the selection of traditional games for the experimental phase. Following the intervention, the quantitative results were complemented by qualitative findings on student engagement in critical and creative thinking. The integration of these data during interpretation provided a comprehensive and unified understanding of how traditional games support cognitive development and grounded the quantitative findings in a broader contextual framework.

Four traditional games—Mule Stake, Zırdır Zımba, Dwarf Hall, and Arab Hair—were identified through focus group interviews with elementary school teachers, who posited that these games could enhance various analytical and cognitive sub-skills. The Handkerchief Grab game was excluded due to its anticipated lack of contribution to the development of critical thinking.

Implementation of the Games

The study used a pretest-posttest control group design. Seventy-nine participants completed the critical thinking assessment before the intervention. The experimental group participated in games for eight weeks, with sessions lasting approximately 40 minutes, four times a week. Rules were explained at the start of each session, prioritising children's safety.

The implementation fidelity was assessed using a checklist for observations and weekly session records. In the experimental group, 95% of the intended intervention elements were successfully executed, with an average session duration of 40 minutes. Observers rated the quality of delivery highly, with a mean rating of 4.6 out of 5 (O'Donnell, 08). In the control group, educators adhered to

the standard curriculum and had no exposure to the intervention content, as confirmed through biweekly interviews and reviews of lesson plans. No instances of contamination were identified between the two groups.

Data Analysis

All students were reassessed after the intervention using the same creative thinking assessment scale administered during the pretest phase. Normality, outliers, and missing values were assessed to determine whether the dataset was suitable for further analysis. Univariate normality was evaluated by calculating skewness and kurtosis for each variable. All values ranged between -2.0 and +2.0, indicating that the data generally followed a normal distribution (George & Mallery). The changes in scores from the pretest to the posttest for both groups were analysed using t-tests to determine if there was a significant improvement in scores after implementing traditional games. Additionally, Pearson correlation coefficients were calculated for each group individually to examine the relationship between pre-test and post-test scores. Finally, a repeated measures ANOVA was conducted to investigate the effects of time, group, and their interaction.

RESULTS

Focus Group Interviews: Can traditional games help develop critical thinking skills?

The study revealed that incorporating traditional games into education may boost children's critical and creative thinking. Games like Mule Stake and Dwarf Hall foster analysis, attention, evaluation, cooperation, problem-solving, and strategic planning. Zırdır Zımba may enhance linguistic abilities, self-regulation, and strategic thinking. Arab Hair improves problem-solving, analytical skills, and collaboration. Handkerchief Grab supports concentration, discipline, and motor skills but may be less effective in promoting cognitive abilities.

Table 2. Enhancement of children's critical and creative thinking skills through traditional games.

Traditional Game	Sub-skill	How the Mechanism Supports Development
Mule Stake	Analysis	Players must analyze the environment and choose optimal actions.
	Attention	Focus is required to observe subtle cues and anticipate changes.
	Cooperation	Cooperation enhances coordinated execution of game tasks.
	Evaluation	Players monitor others' actions, improving perceptual awareness.
	Self-confidence	Successful decision-making builds confidence in one's abilities.
Dwarf Hall	Evaluation	Involves evaluating options and solving problems under constraints.
	Analysis / Math skills	Numerical reasoning emerges as players calculate moves and outcomes.
	Attention	Requires sustained focus to track patterns and opponent actions.
	Strategic planning	Players plan sequences of moves to achieve game objectives.
	Cooperation	Collaborative elements promote shared planning and role distribution.
Zırdır Zımba	Linguistic skills	Using riddles may improve verbal skills.
	Self-regulation	Players assess their decisions and adjust approaches, promoting reflective thinking.
	Analysis	Encourages gathering information and testing hypotheses within game scenarios.
	Strategic thinking & Evaluation	The game's competitive structure requires anticipating moves and planning responses.
	Cooperation	Players must coordinate and collaborate to progress, enhancing teamwork.

Table 2 (Continued). Enhancement of children's critical and creative thinking skills through traditional games.

Traditional Game	Sub-skill	How the Mechanism Supports Development
Arab Hair	Problem-solving	Learners identify challenges and test possible solutions.
	Analysis	Requires anticipating opponent decisions and planning accordingly.
	Inferincing / Decision-making	Fast-paced choices strengthen judgment and evaluative thinking.
	Planning	Players organize steps to achieve successful outcomes.
	Analytical skills	Requires breaking down situations into components to guide actions.
	Cooperation	To be able to untie the rope nots, they have to work together.
	Concentration	Players have to focus on the complex web they have created to untie the nots.
Handkerchief Grab	Concentration	Players sustain focus to react at the correct moment.
	Rule-following	Adhering to structured rules fosters discipline and self-regulation.
	Strategy	Players position themselves and plan timing to succeed.
	Self-confidence	Performing under pressure enhances belief in one's abilities.
	Motor skills	Quick physical responses strengthen coordination and agility.

Table 2 shows how each game can develop specific subskills in children's thinking.

The findings of the focus group study indicated that traditional games may enhance children's critical thinking skills and related subskills, including analytical thinking, mathematical aptitude, creativity, self-confidence, teamwork, and strategic planning.

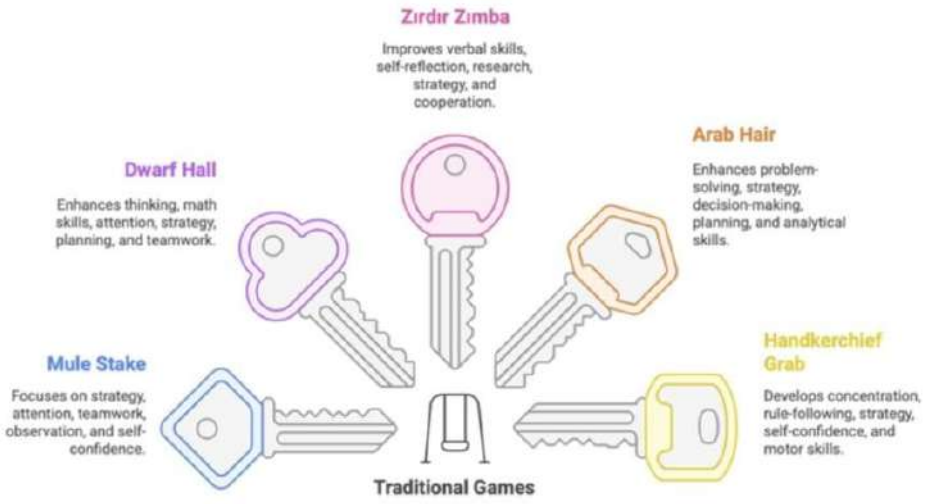


Figure 7. The games and their potential for enhancing critical thinking.

Figure 7 illustrates how each traditional game may enhance children's critical thinking abilities and promote the development of specific subskills.

Mule Stake (Katır Kazığı) & Critical Thinking Skills

The findings of the study indicate that engagement in the Mule Stake game has the potential to facilitate the development of essential competencies among participants. Specifically, involvement in Mule Stake appears to enhance analytical abilities, sustained attention, and teamwork skills. Furthermore, the game may support ongoing assessment of team dynamics and serve to bolster self-confidence through reflective practice.

For example, Kurt stated:

> "This game requires creating chaos and acting together simultaneously, where you must distract the player's attention in the circle. If he does it individually, he will get caught (…). They have to learn to work cooperatively."

In line with Kurt, Mira expressed her ideas and added the game might also improve analysis and strategy:

> "There is more need for cooperation in this game than in other games. While some players distract the tipped player, others try to get their stuff. It is a game that requires a little more strategy (…). They strategise as a group, and it is an entirely cooperative game. Everyone cooperates to distract the mule; if you distract the mule, I will take it, and so on."

Mira agreed:

> "She (the child) needs to determine a strategy, focus her attention, follow the chosen player well, and look at her friends. She may learn from friends about the strategies they use. If they fail, she must abandon the strategy and devise an alternative approach."

Tan also believes the game will enhance the power of analysis and evaluation:

> "The child will try not to get caught by the rival player [the mule] and will follow his partners; for example, the child has to observe the rivals at that moment and analyse their motions, that is, observe them. At this point, it will develop the same sub-skills."

Ezel shares Tan's viewpoint on the issue, adding that the game might also improve problem-solving skills:

> "Making observations will improve analytical thinking and enhance students' decision-making, problem-solving, and other skills."

Ela also believes that the game will foster critical thinking ability and qualities such as being analytical, cooperative, and self-confident.

> "It will develop problem-solving and analytical thinking skills in students. Increases cooperation and self-confidence." In line with Ela, Kurt thinks that: "This might improve students' self-confidence; they also have to think quickly and make decisions more rapidly."

Dwarf Hall (Cüce Höl) & critical thinking skills

The analysis of Dwarf Hall highlights the cognitive and social skills it fosters. Players engage in complex evaluation and problem-solving, often under various constraints, which may encourage the development of reasoning through frequent mathematical calculations and outcome assessments. The game demands sustained attention to follow evolving patterns and anticipate opponent actions, while also requiring strategic planning to achieve objectives. Furthermore, Dwarf Hall's collaborative components support cooperation, as players engage in shared planning and effectively distribute roles to achieve collective success.

For example, Aren thinks that the Dwarf Hall game might improve strategic thinking skills in children:

> "The game promotes cooperation and strategic thinking while helping children develop psychomotor skills. (…) It is not a one-dimensional activity, but it enhances cognitive abilities and quick thinking. As players must focus on two or three elements simultaneously, decision-making skills are crucial in this game."

Kurt agrees with Aren on the issue, adding that the game might also improve self-confidence:

> "As students try to hit the stones without being caught, they need to follow a planned and systematic approach, which will help them gain self-confidence."

Deren also agrees that the game will help children develop analytical thinking skills and understand their limits:

> "The child will also learn about their limits, which we already find challenging. They understand their boundaries, and I have been considering this in the context of the dwarf's role. Within which limits should the child play, and how much can they achieve when restricting their movement within those boundaries? They will be moving in a circular area. I believe this will also enhance their analytical thinking skills. Other players must implement strategies to avoid being caught within those limits."

Ada concurs with Deren, and she believes the game might foster strategy and enhance children's attention spans:

> "He (the child) develops a strategy; for instance, when he first throws it, if he cannot hit, he will move to the right, move to the left, throw fast, and throw slow, etc (…) This might contribute to focusing attention and, thus, critical thinking. The primary issue this generation faces is its short attention span."

Aysu agrees with others and adds that the game might have a positive impact on children. "It will improve students' attention and focus skills."

Ela supports this and says that the game will additionally promote analytical and mathematical thinking:

> "It also requires some mathematical thinking. You have to calculate how far you can throw the stone, in which direction it should be thrown, and so on. Thus, it can develop both analytical and three-dimensional thinking skills."

Mira agrees with Ela that the game can enhance analytical thinking skills and build self-confidence: "It may help students improve their analytical thinking, problem-solving skills, and self-confidence."

Sami adds that, in addition to analytical thinking skills, the game may also foster problem-solving and self-confidence: "This game may develop analytical thinking and problem-solving skills, and may also boost students' self-confidence."

Deniz agrees and adds that the game might improve evaluation and self-confidence: "It is a style game. It may improve various aspects of critical thinking, including interpretation, self-confidence, and openness to different ideas. It is a versatile and playable game."

Mira also thinks that children might learn to be more cooperative when they play this game:

> "For example, cooperation: the child who fails first will watch their other friends and learn from them. By observing them, he will learn new methods that will improve cooperation."

In line with Mira, Deniz thinks*:*

> "Cooperation, problem-solving, and acting in a group. They learn to take turns by throwing stones. He will throw when it is his turn, or he should not throw before his friend."

Zırdır Zımba & critical thinking skills

The study's results show that engaging with the game Zırdır Zımba can provide players with various benefits, especially in developing linguistic skills, self-control, analytical thinking, strategic planning, and teamwork. The game mechanics, including riddles and competitive play, not only improve verbal skills but also promote reflective thinking and collaboration, providing a well-rounded context for assessing participants' cognitive and social development.

For example, Ceren stated that using riddles in the game might improve students' cognitive skills as well as physical coordination while trying to catch each other on one foot:

> "Asking riddles can improve cognitive skills. At the same time, trying to catch on one foot can improve children's physical coordination."

Kurt added: I liked the idea of using riddles: "I believe that will improve language skills in children". Ezel also thinks the game might foster cognitive skills: "I think this kind of self-confidence and analytical skills are things that this game could help kids develop. It will enhance the child's ability to think strategically."

In line with Kurt, Ela believes that using riddles will lead children to research and learn:

> "Assume we played it for the first time, and there are riddles to ask the others. When I tell my ambitious children we will play this game, I am sure they will memorise many riddles and come to class prepared. (…) They will memorise and learn. I think it will be useful for them to learn riddles in this regard. I believe it will push children to do research."

Kurt also believes that this game will improve the strategic thinking of children:

> "Here, students can work with you by developing strategies for themselves. (…) They ask questions first and refine a strategy based on your instructions."

Deniz adds that it is an engaging game fostering concentration: "Planned behaviour, concentration, attention to detail, and an engaging game."

Tan believes that the game will also contribute to focus and can be used to check what is learned in class: "There is attention, and there is focus again. Going out of the circle on one foot requires concentration and balance. Since there is a specific limit, I think he needs to follow the rules and obey the order. It is a game that can be adapted to track achievements across various lessons."

Aren also believes this game is entertaining and might improve psychomotor skills, allowing children to practice what they have learned in class:

> "If we focused on teaching addition in mathematics rather than presenting rhymes to children, we could give them tasks such as addition or subtraction questions. This approach would help develop their psychomotor skills through physical activity and enhance their cognitive abilities in various ways, all while having fun. The child would feel like they are playing a game while learning and practising essential skills."

Tan also agrees with Aren and adds that the game might also improve self-confidence:

> "During the lesson, children will research and participate in a game. Often, when questions are posed, many children hesitate to share their knowledge even though they know the answers. Here, self-confidence plays a crucial role. By incorporating a game, we can help children build their self-confidence in a fun and engaging way. The excitement of the game captures their interest, motivating them to participate and fostering a healthy ambition to succeed. This approach will improve their learning experience and encourage a desire to contribute and engage actively in discussions."

Arab Hair Game & Critical Thinking Skills

The results suggest that participation in the Arab Hair game can develop a range of cognitive and social skills among learners. Notably, the task encouraged problem-solving by prompting individuals to identify challenges and systematically test potential solutions. Players need to track and analyse each move, fostering analytical thinking and advanced decision-making in a fast-paced environment, which may enhance judgment and evaluative skills. The game may also require strategic planning, as participants must organise their actions effectively to achieve successful outcomes. Notably, cooperation proved vital, as untangling the rope knots required collective effort. Lastly, the complex nature of the knots demanded high levels of concentration, pushing players to stay focused and attentive throughout the task.

To illustrate, Ada stated: "First, they create a problem and then solve it. Children set up a problem and then solve it. This is an excellent idea that can be implemented. Ceren concurred that the game may foster problem-solving skills. The game may enhance problem-solving skills, making it a suitable choice for our classes."

Tan agreed and stated that playing the game will increase children's cognitive abilities, such as problem-solving.

> "First, problem-solving came to my mind. After creating that Arab hair, solving it is a process too. Those who throw it (string ball) first need to remember the order, how to solve it more quickly, and how to solve it. They need to think about it. (…) It would be effective because children would be able to set and solve problems."

> Ela added: "This game is feasible and fun; it will encourage students to solve problems (…). It allows them to follow a planned and systematic approach. Ezel agreed: I believe this game will improve critical thinking skills. Students will develop problem-solving skills and learn to think systematically and strategically."

Mira also thinks that the game will teach children to act together:

> "They will strive to win, become more ambitious to win, and want to play. When they play in groups with their friends, they will respond positively and act together. Let's do this; let's do that. They will also develop a sense of achievement in cooperation."

Deren agrees, stating that children might interact in groups instead of only playing with one specific child:

> "In such games, he (the child) directly passes the rope ball to his closest friend. Once he understands the game's logic, he will share the ball with his friends. This often represents one of the biggest challenges. When we engage in class activities, we tend to fall into repetitive patterns, such as playing with just a single child. (…) However, once he grasps the game's logic, he will realise that it should not proceed so monotonously, encouraging more group sharing."

In line with Deren, Ceren adds that the game will improve strategic thinking and cooperation:

> "Establishing a clear strategy is essential to solving this problem effectively. Since collaboration is key, working as a group is particularly beneficial for children at this stage. This problem cannot be tackled individually, and I believe cooperation and teamwork are crucial, especially for today's students."

Kurt added and stated that they thought that the Arab hair game might increase students' communication skills:

> "They also improve their communication skills and refrain from fighting. This strengthens positive attachment. For example, children strengthen positive attachment by learning to act together. (…) This game will equip students with a range of critical thinking skills, including problem-solving, analytical thinking, openness to diverse ideas, planning, self-confidence, and a desire to research. It is undoubtedly an excellent game for developing critical thinking skills, and it can be effectively incorporated into our classes."

Additionally, Ceren believes that students with ADHD can benefit from the game: "Many children have attention deficit problems, making it difficult to focus. For example, when creating Arab hair, I believe children will be more engaged. This approach can be beneficial, encouraging them to focus on the point where the rope originates. By using this method, we can help improve their focus."

Ada agreed and added that it might also improve short-term memory: "They need to know to whom they are throwing the rope and have a plan for that person so that they can solve it again. It is essential to keep this plan in mind in the short term."

Tan concurred with the others: Attention is crucial. He must be mindful of what and who is involved when he throws something, as he will eventually hold it and untie it later.

Ela approaches the issue differently, believing that the game might enhance math abilities and memory: "The game is more complex, providing math skills and improving their memory."

Handkerchief Grab & critical thinking skills

After the presentation on the Handkerchief Grab game, participants expressed that the game might foster concentration, confidence, and *psychomotor* skills, but not critical thinking skills. For instance, Mira believes that kids would become speedier and more focused by playing the handkerchief game:

> "He needs to be right there, ready to grab the handkerchief. Concentration is essential; he has to focus intently. While speed is already the most important criterion, maintaining focus is equally crucial. Once he sets his sights on the handkerchief, he must quickly run away again."

Tan agrees that kids can develop their speed through the game, but not their capacity for critical thought:

> "It just requires speed. Since more resilient children will only be fast, it will not support critical thinking very much."

Deniz also believes that this game may not increase critical thinking skills compared to strategy games:

> "When the rules are clear, the child follows them directly, and yes, the ability to follow them is supported. This is also very important. However, the point we want to reach is critical thinking skills. Of course, games with numerous rules can impact essential thinking skills, but this one is less effective than strategy games."

Deren talks about how the game boosts confidence in oneself: "It will improve their[children's] self-confidence. Sevde agrees with Deren: It will foster self-confidence; children who succeed become more self-assured and feel a sense of accomplishment. They must also act in a planned and cooperative manner."

Unlike the others, Tan thinks that the handkerchief game may improve strategy development and also critical thinking:

> "The child will develop a new strategy. Ultimately, they will attempt to distract the selected player's attention while also diverting another person's focus. This means the child must be more attentive and observant, able to watch two people simultaneously. This will naturally enhance their critical thinking skills."

Ezel concurs and says the game might also enable children to make decisions faster:

> "The child must observe others, make quick decisions, and focus on rivals. I believe this can positively improve a child's critical thinking skills."

The study's findings indicated that four traditional games—Dwarf Hall, Zırdır Zımba, Arab Hair, and Cüce Holl—could effectively enhance critical thinking skills and related abilities. However, the "handkerchief grab" game was found to be less beneficial for this purpose.

The Experiment: Does an 8-week intervention with traditional games improve critical thinking?

The findings from the experimental part of the study provide compelling evidence on the impact of four traditional games—Dwarf Hall, Zırdır Zımba, Arab Hair, and Mull Stake—on class activities. Initial assessments indicated no significant difference in pre-test scores between the control and experimental groups. However, following the intervention, the experimental group showed a marked improvement in post-test scores compared to the control group.

Table 3. Independent samples t-test results.

Test	Group	N	Mean	Std.Dev.	P
Pre-test	Cont. Group	40	11.70	5.29250	.489
	Exp. Group	39	12.74	5.71111	
Post-test	Cont. Group	40	10.00	6.52122	.015*
	Exp. Group	39	14.71	7.17433	

* $p < .05$

The t-test results provided essential insights into the differences between the control and experimental groups. In the pretest, both groups had comparable mean scores: the control group ($M = 11.70$) and the experimental group ($M = 12.74$), indicating no statistically significant difference between the two groups at this stage ($p = .489$; $p < .05$).

However, the t-test analysis revealed a statistically significant difference in post-test scores between the control and experimental groups ($p = .015$; $p < .05$). Specifically, the experimental group achieved a higher mean score ($M = 14.71$) than the control group ($M = 10$).

To better understand the magnitude of the differences observed between groups, effect sizes were calculated for both the pre-test and post-test comparisons.

For the pre-test, the control group (n = 40, M = 11.70, SD = 5.29) and the experimental group (n = 39, M = 12.74, SD = 5.71) did not differ significantly (p = .489). The pooled standard deviation was $SD_p = 5.50$**.**

The effect size was calculated as follows:

Cohen's d = $(M_1 - M_2) / SD_p$
Cohen's d = (11.70 − 12.74) / 5.50 = –.19
|d| = .19 indicates a very small effect size, implying the two groups were essentially equal at the start—no significant difference between groups in the pre-test.

For the post-test, the control group (n = 40, M = 10.00, SD = 6.52) scored lower than the experimental group (n = 39, M = 14.71, SD = 7.17), and the difference was statistically significant (p = .015). The pooled standard deviation was $SD_p = 6.85$**.**

The effect size was calculated as follows:

Cohen's d = $(M_1 - M_2) / SD_p$
Cohen's d = (10.00 − 14.71) / 6.85 = –.69
|d| = .69 represents a medium-to-large effect size**,** indicating that the intervention had a meaningful and positive impact on the experimental group.

Additionally, paired samples t-tests were performed for both the experimental and control groups to assess the effects of traditional games on critical thinking. Pearson correlation coefficients were also computed to evaluate the strength of the relationship between pre-test and post-test scores within each group (see Table 2).

Table 4. Paired sample t-test results.

Group	Compared Tests	t	df	P	Pearson correlation
Exp.	Pre-test vs Post-test	-2.624	39	.012	.757**
Cont.	Pre-test vs Post-test	1.587	40	.129	.689**

* p < .05

The results indicate that the experimental group showed a statistically significant difference between their pre-test and post-test scores ($t_{(39)} = -2.624$, p = .012), indicating an improvement in participants' performance following the game intervention. The Pearson correlation between pre- and post-test scores was r = .757, indicating a strong positive correlation (p < .01). This suggests that, while participants maintained their relative rankings, there was a notable increase in overall scores following the intervention.

In contrast, the control group did not show a statistically significant difference in scores before and after testing ($t_{(40)} = 1.587$, p = .129), implying no substantial change without the intervention. However, the Pearson correlation for this group was also significant (r = .689, p < .01), indicating consistency in their scores over time, but not reflecting any improvement.

Finally, a repeated-measures ANOVA was conducted to examine the effects of time, group, and their interaction (see Table 3).

Table 5. Repeated measures ANOVA results.

Cases	df	F	p	ω^2 (Omega squared)
Time	1	1.221	.284	.003
Group	1	5.383	.032	.094
Time * Gruop	1	16.041	. 001	.124

* p < .05

The analysis revealed no significant main effect of time ($F_{(1, N)} = 1.221$, p = .284, $\omega^2 = .003$), suggesting that changes over time were not statistically significant when both groups were combined. However, there was a significant main effect of group (F = 5.383, p = .032, $\omega^2 = .094$), indicating that

overall, the experimental and control groups differed significantly in their scores. More importantly, the interaction between time and group was significant and moderately strong ($F = 16.041$, $p = .001$, $\omega^2 = .124$), implying that the change over time differed between the groups. This interaction suggests that the traditional games intervention led to a significant improvement in the experimental group than in the control group. The significant interaction effect, highlighted by an omega-squared value of .124, indicates a moderate effect size, reinforcing the practical significance of incorporating games into educational strategies.

DISCUSSION, CONCLUSION, and SUGGESTIONS

This study's findings suggest that traditional games hold promise as an effective pedagogical approach for fostering creative and critical thinking skills, as well as related competencies, among primary school students. The eight-week intervention, which included games such as Dwarf Hall, Zırdır Zımba, Arab Hair, and Mull Stake, resulted in significant improvements in creative thinking, with participants in the experimental group demonstrating notable gains compared to controls. This is also supported by primary school teachers' perceptions, which highlight the potential of these games. The effect sizes indicate a meaningful impact, and statistical analyses confirmed the robustness of these results. These outcomes support the potential integration of traditional games into educational practices to enhance cognitive development and critical thinking abilities.

The findings of this study align with existing research, reaffirming primary school teachers' positive perceptions of play-based learning and its potential to enhance student engagement and develop critical and creative thinking skills. Consistent with prior studies (Nhase et al., 2025; O'Sullivan et al., 2025; Wong et al., 2025; Yılmaz and Griffiths, 2023; Lee et al., 2020), our results suggest that movement-based and decision-making games can support analytical thinking, while immersive experiences, as noted by De Vero and Bar (2023), offer additional educational advantages. Furthermore, the enhancement of problem-solving and critical thinking skills through game-based learning, as described by Akpınar et al. (2023), is echoed in our findings. Although some gains are modest and highly context-dependent, our results concur with studies such as Hanifah (2020) and others that demonstrate the potential of teamwork and prototyping in games to foster social and entrepreneurial skills, with variable impacts on critical thinking influenced by implementation factors.

The findings also align with previous research on the relationship between traditional games and cognitive skills such as problem-solving. For instance, Petty and de Souza (2012) found that traditional games like Mastermind and dominoes enhance executive functions, including problem-solving and attention. Similarly, Li et al. (2016) showed that design-based pedagogy using Lego bricks significantly improved problem-solving abilities compared to conventional instructional methods. Additionally, Jurdi et al. (2018) reported that physical versions of Quizbot games promote collaboration and are perceived as more enjoyable, accessible, and effective than digital versions.

The study's findings resonate with prominent global learning frameworks, such as the P21 Framework for 21st Century Learning, developed through collaboration among educators, experts, and business leaders. This framework highlights critical thinking, creativity, collaboration, problem-solving, and communication as vital skills for success, outlining the necessary knowledge, skills, and support systems to achieve student success across professional, personal, and civic domains. It stresses that learning and innovation skills—such as creativity, critical thinking, communication, and collaboration—are key to preparing students for the complexities of modern society and work. Similarly, the OECD Learning Compass 2030 emphasises the importance of cognitive, social-emotional, and transformative skills in navigating a complex world (OECD, 2019). UNESCO's competence taxonomy extends this focus beyond academics to include transversal competences like values, attitudes, and social responsibility (UNESCO, 2021). By aligning our sub-skills with these frameworks, we situate our findings within internationally recognised standards for future education.

In summary, these findings underscore the potential of traditional games to serve as valuable tools in fostering essential cognitive and social skills, advocating for their strategic integration into contemporary educational practices. The findings of this study confirm that play can serve as a valuable tool for fostering critical thinking skills in children. Educators can harness the inherent strategic, cooperative, and problem-solving elements of traditional games to cultivate critical thinking skills by integrating play-based learning into educational settings. The results presented highlight the effectiveness of these activities in enhancing critical thinking and associated skills, such as problem-solving, creativity, and analytical reasoning. Therefore, traditional games may be valuable practices that can be incorporated into curricula, offering a dynamic and engaging approach to classrooms that aligns with contemporary pedagogical practices.

Limitations of the Study

This study offers valuable insights into how traditional games influence elementary students' critical thinking skills, but it has several limitations. It was conducted in a single school with a small sample size, which may limit the generalizability to other cultural or educational contexts. The intervention lasted only eight weeks, capturing short-term improvements without addressing long-term development or retention of critical and creative thinking skills. Although the Creative Thinking Task for Children (CTTC) scale used in the study is valid and reliable, it does not encompass all aspects of critical thinking, such as questioning and metacognition. Additionally, despite employing a quasi-experimental design, the study does not control for all confounding factors, like differences among teachers or classroom environments. Future research should expand the sample size, incorporate longitudinal approaches, and utilise more comprehensive assessment tools better to capture the diverse facets of critical and creative thinking. The results should be interpreted cautiously, given limitations in sample size, contextual influences, and the need for broader validation across different populations and assessment methods.

Acknowledgments

The authors thank Sibel Aksoy and Yusuf Şahin for their valuable support and feedback, which contributed significantly to this study's development and completion.

Ethics and Conflict of Interest

This study adhered to strict Research Ethics Guidelines and was conducted in accordance with ethical principles. Ethics committee approval was obtained from Gaziantep University (decision dated 09/08/2024, number 529740). Participants' confidentiality and rights were protected, with informed consent secured before participation. Data collection and analysis followed university guidelines, supporting the trustworthiness of the findings. The authors declare that they acted in accordance with ethical rules in all processes of the research. The authors declare no conflicts of interest.

Author Contributions

Suna Utar Özkan: Conceptualisation, methodology, conducting the interviews, Data analysis and interpretation, and writing the original draft.
Sevilay Şahin: Conceptualisation, methodology, data collection, review, and editing,
Zarife Pancar: Conceptualisation, literature review, and data collection.

Data availability

The data that support the findings of this study are available on request from the corresponding author.

Corresponding Author

Correspondence to Suna UTAR ÖZKAN, suna.ozkan@gibtu.edu.tr

REFERENCES

Adams, K. (2014). What is a child? Children's perceptions, the Cambridge Primary Review and implications for education. *Cambridge Journal of Education, 44*(2), 163–177. https://doi.org/10.1080/0305764X.2013.860082

Aiono, S. M. (2020). *An investigation of two models of professional development to support effective teaching through play practices in the primary classroom* (Unpublished doctoral dissertation). Massey University, Manawatū, New Zealand.

Bailey, C. (2019, April 5). How to get your brain to focus [Video]. TEDxManchester. https://www.youtube.com/watch?v=Hu4Yvq-g7_Y

Belcher, W. L. (2019). *Writing your journal article in twelve weeks: A guide to academic publishing success* (2nd ed.). University of Chicago Press.

Bruner, J. (1996). *The culture of education*. Harvard University Press.

Buckingham, D. (2000). *After the death of childhood: Growing up in the age of electronic media*. Polity Press.

Chan, H. F., Guillot, M., Page, L., & Torgler, B. (2015). The inner quality of an article: Will time tell?. *Scientometrics, 104*(1), 19-41. https://doi.org/10.1007/s11192-015-1581-y

Creswell, J. W. (2017). *Educational Research: Planning, Conducting, and Evaluating Quantitative and Qualitative Research*. Pearson Education

Daniel, M. F., & Auriac, E. (2011). *Philosophy, critical thinking and philosophy for children*. *Educational Philosophy and Theory*, *43*(5), 415–435.

David, A., & Simpson, J. (Eds.). (2006). *The Norton anthology of English literature: The middle ages* (8th ed., Vol. A). W. W. Norton & Company.

Dawadi, S., Shrestha, S., & Giri, R. A. (2021). Mixed-methods research: A discussion on its types, challenges, and criticisms. *Journal of Practical Studies in Education*, *2*(2), 25–36. https://doi.org/10.46809/jpse.v2i2.20

Devecioğlu, Y., & Karadağ, Z. (2016). Amaç, beklenti ve öneriler bağlamında zekâ oyunları dersinin değerlendirilmesi [Evaluatıon of mind puzzle course at the context of goals, expectations and recommendations]. *Journal of Bayburt Education Faculty*, *9*(1), 41 - 61.

Dewi, N. R., Saputri, E., Nurkhalisa, S., & Akhlis, I. (2020, June). The effectiveness of multicultural education through traditional games-based inquiry toward improving students' scientific attitudes. In Journal of Physics: Conference Series (Vol. 1567, No. 4, p. 042051). IOP Publishing. https://doi.org/10.1088/1742-6596/1521/4/042125

Divald, S. (2023). Rethinking autonomy: Traveling between quantitative and qualitative approaches. *Nationalities Papers*, *51*(4), 727–735.

Fabian, J. J. (2020, May 14). UX in free educational content. In J. S. Doe (Chair), The case of the Purdue OWL: Accessibility and online content development [Panel presentation]. Computers and Writing 2020, Greenville, NC, United States.

Facione, P. A. (2011). Critical thinking: What it is and why it counts. *Insight Assessment*, *1*(1), 1-23.

Fung, W. K., & Chung, K. K. H. (2025). Interrelationships among parental play support and kindergarten children's playfulness and creative thinking processes. *Thinking Skills and Creativity*, *58*, Article 101907. https://doi.org/10.1016/j.tsc.2025.101907

Gee, J. P. (2003). *What video games have to teach us about learning and literacy*. Palgrave Macmillan.

Gelder, V. T. (2001, December). How to improve critical thinking using educational technology. In Meeting at the crossroads: Proceedings of the 18th Annual Conference of the Australasian Society for Computers in Learning in Tertiary Education (pp. 539-548).

George, D., & Mallery, P. (2016). *IBM SPSS statistics 23 step by step: A simple guide and reference*. Routledge.

Golinkoff, R. M., Kucirkova, N., & Hirsh-Pasek, K. (2025). Playful learning is the missing link in educational success. *Learning and Instruction*, *96*, 102073. https://doi.org/10.1016/j.learninstruc.2024.102073

Gressick, J., & Langston, J. B. (2019). Card game to improve critical thinking. *Journal of Global Engagement and Transformation*. https://doi.org/10.52553/30001b

Hanifah, A. N. (2020). *Development of history interactive learning media through ludo teaching to improve student's critical thinking*. In Social, Humanities, and Educational Studies (SHES): Conference Series (Vol. 3, No. 2, pp. 252-266). https://doi.org/10.20961/SHES.V3I2.46246

Huang, S., Pierce, R., & Stamey, J. (Eds.). (2006). Proceedings of the 24th annual ACM international conference on the design of communication. ACM Digital Library. https://dl.acm.org/citation.cfm?id=1166324

Huizinga, J. (1955). *Homo Ludens: A study of the play-element in culture*. Beacon Press.

International Labour Organization (2023). Child labour in Türkiye. https://www.ilo.org/ankara/projects/child-labour/lang--en/index.htm

Johnson, R. B., Onwuegbuzie, A. J., & Turner, L. A. (2007). Toward a definition of mixed methods research. *Journal of Mixed Methods Research, 1*(2), 112–133. https://doi.org/10.1177/1558689806298224

Jurdi, S., Garcia-Sanjuan, F., Nacher, V., & Jaen, J. (2018). Children's acceptance of a collaborative probem solving game based on physical versus digital learning spaces. *Interacting with Computers, 30*(3), 187–206.

Kenny, D. A. (2019). Enhancing validity in psychological research. *American Psychologist, 74*(9), 1018.

Leitch, M. G., & Rushton, C. J. (Eds.). (2019). *A new companion to Malory*. D. S. Brewer.

Lee, R. L. T., Lane, S., Brown, G., Leung, C., Kwok, S. W. H., & Chan, S. W. C. (2020). Systematic review of the impact of unstructured play interventions to improve young children's physical, social, and emotional wellbeing. *Nursing & Health Sciences, 22*(2), 184–196.

Lestariningrum, A. (2017). The effects of the traditional game 'congklak' and self-confidence on the logical mathematical ıntelligence of 5-6 year-old children. *Journal Ilmiah Pendidikan Prasekolah dan Sekolah Awal, 3*(1), 13-22. https://doi.org/10.24269/jin.v3n1.2018.pp13

Li, Y., Huang, Z., Jiang, M., & Chang, T. W. (2016). The effect on pupils' science performance and problem-solving ability through Lego: an engineering design-based modeling approach. *Educational Technology & Society, 19*(3), 143–156.

Magnusson, M. (2024). "T¨ ank om": Lekresponsiv undervisning om skriftspråkskunskap if¨ orskoleklassen ["What if": Play-responsive teaching about literacy in the preschool class]. *Forskning om undervisning och l¨ arande, 12*(1), 27-46. https://doi.org/10.61998/forskul.v12i1.22915

Maina, M. P., Maina, J. S., & Hunt, K. (2016). Initiative Games in Physical Education: A Practical Approach for Teaching Critical Thinking Skills—Part 1. *Strategies, 29*(3), 28-33.

Matson, E. (2018, November 5). Drones and autonomous vehicles: The latest new technology to come with potential threat [Conference session]. Dawn or Doom 2018 Conference, Purdue University, West Lafayette, IN, United States.

Mayring, P. (2014). *Qualitative content analysis- theoretical foundation, basic procedures and software solution*. Klagenfurt, Monograph, http://nbnresolving.de/urn:nbn:de:0168-ssoar-395173

McDonald, S. D. (2017). Enhanced critical thinking skills through problem-solving games in secondary schools. *Interdisciplinary Journal of e-Skills and Lifelong Learning, 13*, 79–96.

Mokhtar, R., Lehat, M.L., Basir, N.M., & Sokman, Y. (2015). A tangible game-based approach for ıntroducing programming to elementary school students. *International Journal of Information and Education Technology, 5*, 246-249. https://doi.org/10.7763/IJIET. 2015.V5.510

Moore L., Hallingberg B., Wight D., Turley, R., Segrott, J., Craig, P., Robling, M., Murphy, S., Simpson, S.A., & Moore, G. (2018). Exploratory studies to inform full-scale evaluations of complex public health interventions: The need for guidance. *Journal of Epidemiology Community Health, 72*(10), 865-866.

Morse, J. M., & Coulehan, J. (2015). Maintaining confidentiality in qualitative publications. *Qualitative health research, 25*(2), 151-152.

Movshovich, J. (2014). *Children's participation in society; a key to development: children as essential actors in improving their lives and communities* (Doctoral dissertation, Université Paris 1 Panthéon-Sorbonne).

National Association for the Education of Young Children. (2009). NAEYC standards for early childhood professional preparation programs. https://www.naeyc.org/files/naeyc/file/positions/ProfPrepStandards09.pdf

Nordin, M. B., Maidin, S. S., Rajoo, M., Magiman, M. M., & Mosbiran, N. F. (2022). International frameworks for 21st century competences: comparative education. *Res Militaris, 12*(2), 7332-7344.

Nussbaum, M. C. (2010). *Not for profit: Why democracy needs the humanities*. Princeton University Press.

OECD. (2019). *The OECD Learning Compass 2030*. Concept note series. OECD. https://www.oecd.org/content/dam/oecd/en/about/projects/edu/education-2040/1-1-learning-compass/OECD_Learning_Compass_2030_Concept_Note_Series.pdf

Özdemir N. (2006). *Türk çocuk oyunları*. Ankara: Akçağ Basım Yayım Pazarlama A.Ş.

Özden Gürbüz, D. (2016). Geleneksel çocuk oyunları ve eğitimsel işlevleri: Emirdağ örneği. *International Periodical for the Languages, Literature and History of Turkish or Turkic., 11*(14), 529-564.

Palanker, D., Volk, J., Lucia, K., & Thomas, K. (2018). Mental health parity at risk: Deregulating the individual market and the impact on mental health coverage. National Alliance on Mental Illness. https://www.nami.org/About-NAMI/Publications-Reports/Public-Policy-Reports/Parity-at-Risk/ParityatRisk.pdf

Paul, R., & Elder, L. (2013). *Critical thinking: Tools for taking charge of your professional and personal life*. Pearson Education.

Passos, A. G. de A., Alves, M. A. C., Leal, S. S. I., & Sousa, G. M. D. (2024). Os efeitos dos jogos eletrônicos para estimulação das funções cognitivas com crianças e adolescentes: uma revisão da literatura. *Revista Contemporânea*. https://doi.org/10.56083/rcv4n1-255

Patton, M. Q. (2002). *Qualitative research & evaluation methods*. Sage.

Paul, R. W., & Elder, L. (2006). Critical thinking: The nature of critical and creative thought. *Journal of Developmental Education*, *30*(2), 34–35.

Paul, R., & Elder, L. (2006). *Critical thinking: Tools for taking charge of your learning and your life*. Pearson/Prentice Hall.

Petrovska, S., Sivevska, D., & Cackov, O. (2013). Role of the game in the development of preschool child. *Procedia-Social and Behavioral Sciences*, *92*(1), 880-884.

Petty, A. L., & de Souza, M. T. C. C. (2012). Executive functions development and playing games. *US-China Education Review*, *9*, 795–801.

Prout, A., & James, A. (2015). A new paradigm for the sociology of childhood? Provenance, promise and problems. In A. James & A. Prout (Eds.), Constructing and reconstructing childhood: Contemporary issues in the sociological study of childhood (pp. 6–28). Routledge.

P21 Partnership for 21st Century Skills. (2025). *Framework for 21st Century Learning*. Retrieved December 12, 2025, from https://www.battelleforkids.org/wp-content/uploads/2023/11/P21_Framework_Brief.pdf

Richards, C. (2019, December 9). Best music of 2019: Lana Del Rey sings lullabies about the end of America. The Washington Post. https://www.washingtonpost.com/entertainment/music/best-music-of-2019-lana-del-rey-sings-lullabies-about-the-end-of-america/2019/12/06/6e82c5ec-15d8-11ea-a659-7d69641c6ff7_story.html

Rifayanti, Z. E. T., Mustaji, Mariana, N., & Suryanti. (2024). Enhancing critical thinking and problem-solving skills in upper elementary students through game-based learning. Perspektivy nauki i obrazovania – *Perspectives of Science and Education*, *70*(4), 396–420. https://doi.org/10.32744/pse.2024.4.25

Rogoff, B. (2003). *The cultural nature of human development*. Oxford University Press.

Rosli, M. S., & Saleh, N. S. (2022). Enhancing HOTS using Problem-Based Learning and Digital Game in the Context of Malaysian Primary School. *International Journal of Interactive Mobile Technologies*, *16*(02), 101–112. https://doi.org/10.3991/ijim.v16i02.27677

Ryua, H. B., Parsonsb, D., & Leea, H. (2014). Using game-based collaborative learning to enhance critical thinking skills. *Advances in Affective and Pleasurable Design*, 19(5), 461–475.

Samuelsson, I. P. (2025). Play-responsive teaching as an alternative way of perceiving the relations between play, teaching and learning. *Learning and Instruction*, *95*, 102040. https://doi.org/10.1016/j.learninstruc.2024.102040

Sebastián, C., Vergara, M., Lissi, M. R., Henríquez Pino, C., Silva, M., & Pérez-Cotapos, M. A. (2025). Playful stances for developing pre-service teachers' epistemic cognition: Addressing cognitive, emotional, and identity complexities of epistemic change through play. *Learning and Instruction*, *95*, 102008. https://doi.org/10.1016/j.learninstruc.2024.102008

Seferoğlu, S. S., & Akbıyık, C. (2006). Eleştirel düşünme ve öğretimi [Teaching critical thinking]. *Hacettepe University Journal of Education*, *30*(30), 193-200.

Shamsuar, N. R. (2014). Game design as a tool to promote higher order thinking skills. *Int. J. Innov. Educ. Res*, *2*(6), 51-58.

Stuster, J., Adolf, J., Byrne, V., & Greene, M. (2018). Human exploration of Mars: Preliminary lists of crew tasks (Report No. NASA/CR-2018-220043). National Aeronautics and Space Administration. https://ntrs.nasa.gov/archive/nasa/casi.ntrs.nasa.gov/20190001401.pdf

Suárez, J. M. C., Ríos, O. R. W., Reyes, V. M., Morales, A. G. S., & Casana, P. F. D. (2024). Effects of gamification on critical thinking in elementary school students. *Prohominum*, *6*(4), 112-122.

Tashakkori, A., & Teddlie, C. (2010). *SAGE Handbook of mixed methods in Social & behavioural research* (2nd ed.). Sage Publications.

Tatlı, C. E., & Artar, M. (2022). Developing the creative thinking task for children. *Journal for the Education of Gifted Young Scientists, 10*(2), 313–333.

Tsalapatas, H. (2015). Evaluating the use of programming games for building early analytical thinking skills. *EAI Endorsed Transactions, 2*(6), 3e. https://doi.org/10.4108/eai.5-11-2015.150610

UNESCO. (2021). *UNESCO competency framework—skills, attitudes and values for COVID-19*. UNESCO. https://en.unesco.org/sites/default/files/competency_framework_e.pdf

United States Government Accountability Office. (2019). *Performance and accountability report: Fiscal year 2019*. https://www.gao.gov/assets/710/702715.pdf

Vero, I., & Barr, M. (2023). A historical text-based game designed to develop critical thinking skills. *International Journal of Game-Based Learning (IJGBL), 13*(1), 1–14.

Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Harvard University Press.

Wimmer, A., Buzady, Z., Csesznak, A., & Szentesi, P. (2022). Intuitive and analytical decision-making skills analysed through a flow developing serious game. *Journal of Decision Systems, 31*(sup1), 4-17.

Yee, L. J., Radzi, N. M. M., & Mamat, N. (2022). Learning through play in early childhood: A systematic review. *International Journal of Academic Research in Progressive Education and Development, 11*(4), 985–1031. http://dx.doi.org/10.6007/IJARPED/v11-i4/16076

Yılmaz, E., & Griffiths, M. D. (2023). Children's social problem-solving skills in playing videogames and traditional games: A systematic review. *Education and information technologies, 28*(9), 11679-11712.

About the authors

Suna UTAR ÖZKAN
She is an Assistant Professor and Vice Dean at the Faculty of Economics and Social Sciences at Gaziantep Islam & Science University. She holds a PhD in Educational Management. Her research interests include educational management, university–community engagement, social inequality, and inclusive university policies. Her work examines how universities can invest in their surrounding communities and fulfil their civic responsibilities. She highlights sustainability and the transformative role of universities in improving community well-being and advocates for a socially responsible approach to higher education.

Sevilay ŞAHİN
She is a faculty member at Gaziantep University, Faculty of Education, Department of Educational Sciences. She teaches undergraduate and postgraduate courses in educational management and leadership at her affiliated university. Her research interests include higher education, educational leadership, teacher training, and social responsibility in education. She has published numerous articles in both national and international journals and has presented her work at various academic conferences. In addition to serving as a reviewer for academic journals, she is actively involved in civil society organisations, including the Association for Supporting Entrepreneurial Women. She has led projects addressing social and educational issues and was awarded the 2016 Presidency Award for her project on child brides in Turkey.

Zarife PANCAR
She is an Associate Professor at Gaziantep University, Faculty of Sport Sciences. She teaches undergraduate and postgraduate courses in sports sciences at her university. Her research interests include sports physiology, training science, nutritional supplements, biomechanics, motor skills, and athlete performance, with a particular focus on handball. She has participated in TÜBİTAK-funded research projects and has numerous publications in national and international journals. In addition to her academic duties, she operates as an Erasmus Coordinator and is a member of the Quality Committee at her university.

IOJPE

ISSN: 1300 – 915X
www.iojpe.org

International Online Journal of Primary Education *2025, volume 14, issue 4*

DIGITAL GAME ADDICTION IN PRIMARY SCHOOL CHILDREN: AN ANALYSIS IN TERMS OF USAGE HABITS AND DEMOGRAPHIC VARIABLES

Tubanur ÇELİK İSKİFOĞLU
Assist. Prof. Dr., Girne American University, Faculty of Education, North Cyprus
ORCID: https://orcid.org/0000-0001-6630-9244
tubanurcelik@gau.edu.tr

Received: November 10, 2025 **Accepted:** December 28, 2025 **Published:** December 31, 2025

Suggested Citation:
Tubanur Çelik Iskifoğlu, T. (2025). Digital game addiction in primary school children: An analysis in terms of usage habits and demographic variables. *International Online Journal of Primary Education (IOJPE), 14*(4), 262-278. https://doi.org/10.55020/iojpe.1821039

Abstract

This study aimed to examine the digital game addiction levels, usage habits, and technology exposure patterns of primary school students in relation to demographic variables such as gender, age, family structure, and duration of daily technology use. The research was conducted using a quantitative design based on a descriptive survey model to identify existing conditions and reveal the relationships among key variables. The study group consisted of 150 students enrolled in the 3rd, 4th, and 5th grades of a private primary school in the Turkish Republic of Northern Cyprus (TRNC) during the 2023–2024 academic year. Data were collected using a researcher-developed Personal Information Form and the *Computer Game Addiction Scale for Children*. Nonparametric statistical analyses were employed due to non-normal data distribution, including Kruskal–Wallis and Mann–Whitney U tests, with significance set at $p < .05$. The findings revealed that more than half of the participants (55.6%) used technological devices between one and three hours per day, while 9.2% reported daily use exceeding ten hours. The most common purpose of technology use was playing games (37.9%), followed by social media use (16.3%) and watching videos (14.4%). Statistical analysis showed a significant relationship between daily technology use duration and digital game addiction scores. Students who used technology for ten or more hours per day exhibited markedly higher addiction levels than other groups. Moreover, technology used primarily for entertainment purposes—especially gaming—was found to be associated with higher addiction scores compared to educational use such as completing homework.

Keywords: Digital game addiction, primary school students, technology use, family structure, gender differences, digital learning.

INTRODUCTION

Childhood is a critical phase of the human life cycle in which physical, cognitive, emotional, and social development accelerate, laying the foundations of personality.Extending from birth to adolescence, this period encompasses not only biological maturation but also the profound effects of environmental interactions on the child. A healthy childhood experience directly shapes an individual's later psychological adjustment, social relationships, and learning abilities (Özer, Gürkan, & Ramazanoğlu, 2006; Erden & Bulut, 2023). Therefore, ensuring that children grow up in safe, supportive, and interactive environments that meet their developmental needs constitutes the cornerstone of social well-being.

Play is one of the most defining activities of childhood. For children, play serves not merely as a source of entertainment but as a means of making sense of the world, expressing emotions, and experimenting with social roles (Arslan & Dilci, 2018). The educational value of play has long been emphasized by developmental theorists such as Piaget, Vygotsky, and Bruner. According to Piaget, play is an activity through which children balance and reorganize their cognitive schemas, while Vygotsky viewed it as a "zone of proximal development" where learning occurs through social interaction. This perspective underscores that play contributes not only to cognitive growth but also to social maturation.

Through play, children explore their environment, develop problem-solving skills, and learn to understand others' feelings and perspectives. Hence, play represents a learning domain in which both

personal and social competencies are constructed (Bora Güneş & Çavuşoğlu, 2022; Burgaz Uskan & Bozkuş, 2019). However, in recent years, the concept of play has undergone a structural transformation under the influence of technology; traditional games emphasizing physical activity and face-to-face interaction have increasingly been replaced by virtual games played in digital environments.

The global digital transformation has profoundly reshaped how children spend their leisure time and how they learn. Technological devices such as smartphones, tablets, computers, and game consoles have shifted play from physical spaces to virtual ones, redefining children's domains of interaction (Horzum, 2011; Özarslan & Perdahcı, 2023). The decline of traditional playgrounds, parental safety concerns, and urbanization have further steered children toward digital gaming. Although digital games may offer certain benefits within contemporary educational approaches—such as enhancing attention, speed, and strategic thinking—uncontrolled and excessive use carries significant developmental risks (Doğan Keskin & Aral, 2021). These risks include social isolation, academic decline, physical inactivity, increased aggression, and addictive behaviors.

The pedagogical dimension of this transformation is equally significant. When integrated with educational technologies, digital games can serve as a supportive medium for learning (Green & Bavelier, 2003). However, when they shift from being a *learning tool* to an *escape space*, they can adversely affect children's developmental balance. Children between the ages of 6 and 12 are particularly vulnerable to the reward mechanisms of digital games because their cognitive control processes are not yet fully developed. This vulnerability has contributed to the rapid increase of gaming addiction during childhood.

Digital game addiction is a behavioral disorder characterized by a loss of control over gaming behavior, disruption of daily activities, and weakening of social relationships. The American Psychiatric Association (APA, 2013) classified this condition as *Internet Gaming Disorder* (IGD) in the *Diagnostic and Statistical Manual of Mental Disorders (DSM-5),* noting that it exhibits neuropsychological symptoms as severe as those observed in substance addiction (Yalçın Irmak & Erdoğan, 2016). According to the DSM-5, a diagnosis of gaming addiction can be made if at least five of the following nine criteria are met within a 12-month period: (1) preoccupation with gaming, (2) irritability when not playing, (3) increasing amounts of time spent gaming, (4) unsuccessful attempts to reduce or stop gaming, (5) loss of interest in other activities, (6) continued gaming despite negative consequences, (7) deception of others about gaming habits, (8) gaming as a means of escaping stress or guilt, and (9) impaired academic, social, or occupational functioning (APA, 2013).

In this context, digital game addiction should not be viewed merely as an individual habit but as a multidimensional problem that affects the family, school, and wider social environment. Prolonged gaming behavior in children has been linked to musculoskeletal problems, sleep disorders, irregular eating habits, attention deficits, aggression, and feelings of loneliness (Erden & Bulut, 2023; Güvendi, Tekkurşun Demir & Keskin, 2019).

The existing literature indicates that digital game addiction has a significant impact on children's social development.Primary-school-aged children, in particular, learn social norms and cooperative behaviors through play. Yet excessive engagement with digital games weakens these social learning processes and impedes the development of empathy (Yiğit & Mercan Uzun, 2022).

Furthermore, the reward systems of digital games, which stimulate dopamine release, orient children toward short-term pleasure. This tendency undermines the development of executive functions such as patience, self-control, and goal-directed behavior. Prolonged screen exposure is often associated with attention deficits, low academic performance, and social isolation (Mustafaoğlu & Yasacı, 2018). Some research also indicates that digital games can be beneficial when used appropriately. For instance, Green and Bavelier (2003) argued that action-based video games can enhance visual attention skills. However, these effects remain valid only when the duration and purpose of play are

properly regulated. Excessive and unmonitored use may trigger a cycle of dependency among children.

In the context of Türkiye and the Turkish Republic of Northern Cyprus (TRNC), research over the past decade indicates a growing scholarly interest in the topic of digital game addiction (Horzum, 2011; Yiğit & Günüç, 2020; Gökçen, 2023). However, most existing studies have been conducted with adolescents or high school students. The scarcity of empirical findings focusing on primary school children has led to the neglect of early symptoms of addiction in this age group. Moreover, the majority of studies employ quantitative methods, with limited attention given to mixed-method designs that integrate the perspectives of parents, teachers, and children in a holistic manner. The paucity of studies conducted specifically within the TRNC context further deepens this academic gap. Consequently, understanding how children's cultural, economic, and technological environments shape addictive behaviors remains challenging.

Accordingly, this study makes a pioneering contribution by investigating digital game addiction levels among primary school children in the TRNC. Its scope extends beyond merely determining addiction levels to analyzing the effects of variables such as age, gender, family structure, and duration of technology use on addictive behavior.

Despite the increasing international awareness of digital game addiction, research focusing on primary-school-aged children remains limited. Yet this developmental period is precisely when addictive tendencies can first be observed and early intervention programs can be implemented most effectively. Another notable gap in the literature concerns the absence of comprehensive models that examine the effects of digital game addiction on children's socio-emotional development, family relationships, and academic life. Research conducted in Türkiye and the TRNC largely addresses the prevalence of addiction, while neglecting deeper analyses of causality, inter-variable variation, and social context.Within this framework, the present study contributes to the literature by providing a regionally grounded dataset and addressing children's digital gaming habits through a multidimensional lens. The findings are expected to inform the development of early intervention strategies for teachers, parents, and school counselors. The rapid proliferation of digital technologies in recent years has fundamentally transformed children's play habits and introduced new developmental risks. Although existing literature highlights the physical, emotional, and social consequences of digital game addiction, it also points to the lack of integrative models that explain addictive tendencies among primary-school-aged children. In this context, the central research question guiding this study can be articulated as follows:

How do primary school children's levels of digital game addiction differ according to variables such as age, gender, family structure, and daily technology use, and how does this addiction influence their socio-emotional development?

Based on the reviewed literature, a conceptual framework was developed to explain the relationships among demographic characteristics, digital technology use behaviors, and digital game addiction in primary school children. This framework also incorporates the potential developmental outcomes of addiction and highlights the moderating role of digital balance and parental mediation (Figure 1).

IOJPE
ISSN: 1300 – 915X
www.iojpe.org
International Online Journal of Primary Education 2025, volume 14, issue 4

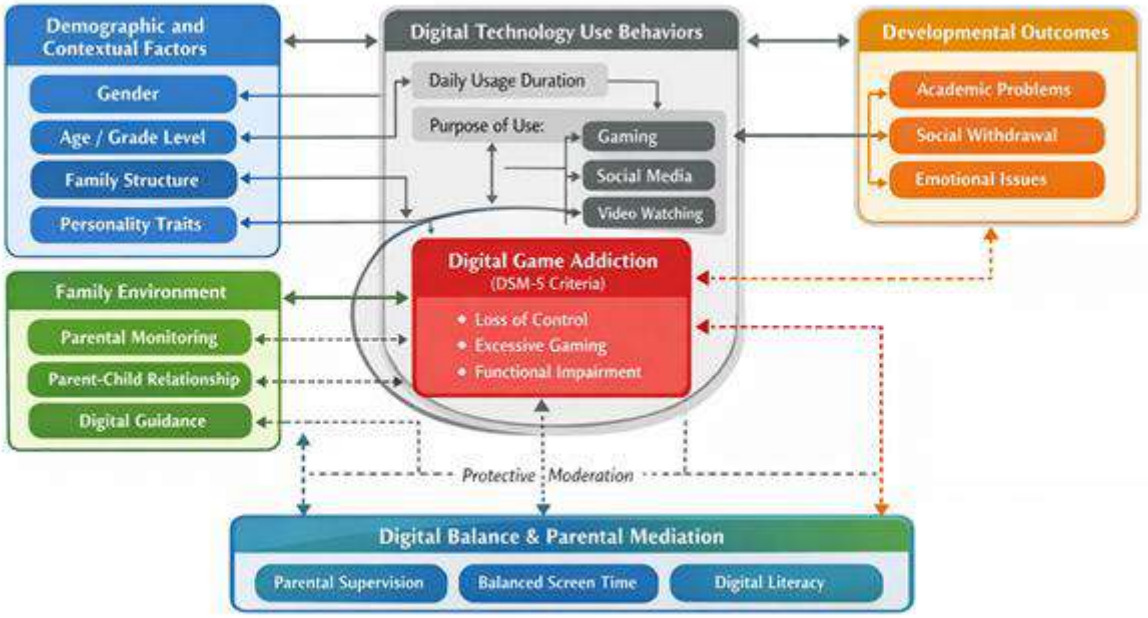


Figure 1. Conceptual model of digital game addiction in primary school children.

Figure 1 presents the conceptual framework guiding the present study. The model illustrates how demographic and contextual factors (gender, age/grade level, and family structure) influence children's digital technology use behaviors, including daily usage duration and purpose of use. These behaviors contribute to the development of digital game addiction, conceptualized in line with DSM-5 criteria (loss of control, excessive gaming, and functional impairment). The model further depicts the developmental outcomes associated with digital game addiction, such as academic problems, social withdrawal, and emotional difficulties, while emphasizing the protective and moderating role of digital balance and parental mediation.

METHOD

This study was conducted within the framework of a quantitative research approach, employing a *descriptive survey design*. The descriptive survey model is used to define an existing situation as it currently exists and to statistically reveal the relationships between variables (Karasar, 2020). In this context, the study examined the relationships among primary school students' digital gaming duration, usage habits, and levels of gaming addiction.

The research was carried out with students enrolled in the 3rd, 4th, and 5th grades of a private primary school in the Turkish Republic of Northern Cyprus (TRNC). Consistent with the research objectives, the study examined whether students' digital game addiction levels varied across different demographic variables. Data were analyzed using the Kruskal–Wallis test and Post Hoc techniques. These nonparametric methods were selected because the sample distribution was non-normal and the data were measured on an ordinal scale (Field, 2018). All statistical analyses were performed using SPSS 24.0 software.

Population and Sample

The population of the study consisted of 3rd-, 4th-, and 5th-grade students attending private primary schools in the TRNC during the 2023–2024 academic year (fall semester). Since reaching the entire population was not feasible, a convenience sampling method was employed. This method allows researchers to collect data from accessible and voluntary participants (Büyüköztürk, Kılıç Çakmak, Akgün, Karadeniz, & Demirel, 2021).

The sample included 150 students who voluntarily agreed to participate in the research. Prior to data collection, participants were informed about the purpose of the study, and informed consent was obtained on a voluntary basis. Data were collected through face-to-face questionnaires administered in classroom settings. During administration, the researcher and classroom teachers provided necessary explanations and ensured that the children understood the questions. The data collection process lasted approximately two weeks.

Data Collection Instruments

Personal Information Form: Developed by the researcher, this form was designed to identify students' demographic and socio-economic characteristics. It included questions regarding grade level, gender, age, parental cohabitation status, and daily technology usage time. Preliminary data collected through the form helped identify individual and environmental factors that may influence addiction levels.The primary aim of this form was to facilitate the interpretation of scores obtained from the digital game addiction scale and to support the examination of relationships among variables (Creswell & Creswell, 2018).

Computer Game Addiction Scale for Children: The principal measurement tool used in the study was the *Computer Game Addiction Scale for Children*, developed by Horzum, Ayas, and Çakır Balta (2008). The scale was designed to measure the level of digital game addiction among 3rd-, 4th-, and 5th-grade students. It consists of 21 positively worded items rated on a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). No reverse-coded items are included, and higher scores indicate higher levels of digital game addiction. Factor analysis conducted during the original scale's development revealed a four-factor structure, and the overall reliability coefficient was reported as Cronbach's $\alpha = .86$, indicating high internal consistency (Horzum et al., 2008; Tavşancıl, 2010). To test item discrimination, an independent-samples *t*-test was performed between the lower 27% and upper 27% groups, revealing significant differences for all items.

In the present study, the scale was administered in its original paper-and-pencil format. Each student completed the scale in approximately 15 minutes. The level of statistical significance was set at $p < .05$.

Data Collection Procedures

The data collection process was carried out during the fall semester of the 2023–2024 academic year. Permission was obtained from the school administration prior to implementation. Teachers and parents were informed about the purpose, scope, and ethical principles of the research. Parental consent forms were collected before obtaining data from students.

Throughout all stages of the research, participant confidentiality was maintained, and all data were used solely for scientific purposes. Questionnaires were administered in a quiet and focused classroom environment, with the researcher guiding participants to ensure comprehension. At the conclusion of the process, students received a brief digital awareness session, including informative guidance on healthy and balanced digital game use.

Data Analysis

Data analysis was performed using SPSS 24.0. Prior to statistical analysis, data accuracy and missing values were examined. The normality of distributions was tested using the Kolmogorov–Smirnov test, which indicated non-normality; thus, nonparametric statistical methods were employed.

The following analyses were conducted:

- Frequency and percentage distributions to describe participants' demographic characteristics;
- Kruskal–Wallis H tests to compare digital game addiction scores according to variables such as gender, grade level, and daily technology use;
- Post Hoc (Mann–Whitney U) tests to determine between-group differences.

The level of statistical significance was set at $p < .05$, and results were supported by relevant tables. Findings were interpreted in light of the existing literature. To ensure transparency and replicability of the research process, the methodological steps of the present study were systematically structured. The study followed a quantitative research approach based on a descriptive survey design, aiming to examine digital game addiction levels and technology use behaviors among primary school children. The overall methodological procedure, from defining the target population to the statistical analyses employed, is visually summarized in Figure 2.

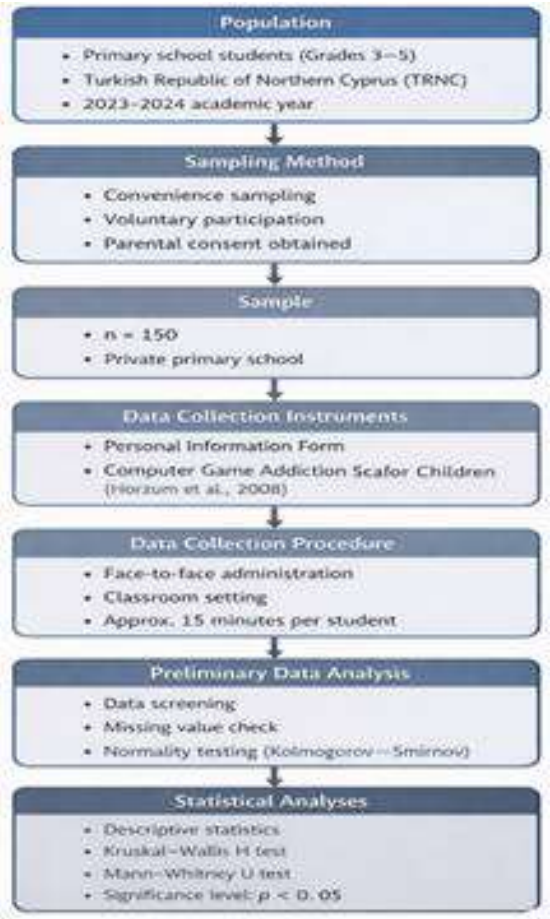


Figure 2. Methodological flowchart of the study.

As illustrated in Figure 2, the study population consisted of primary school students enrolled in Grades 3 to 5 in the Turkish Republic of Northern Cyprus during the 2023–2024 academic year. A convenience sampling method was employed due to accessibility considerations, and participation was based on voluntariness with parental consent obtained prior to data collection. Data were gathered through face-to-face administration of the Personal Information Form and the Computer Game Addiction Scale for Children in classroom settings. Preliminary data screening and normality testing indicated non-normal distribution, leading to the use of nonparametric statistical analyses.

Ethical Considerations

The research was conducted in strict adherence to the principles of voluntary participation, participant confidentiality, and informed consent, and data were used exclusively for scientific purposes. The study complied with the Scientific Research and Publication Ethics Directive of the Council of Higher Education (2020) and adhered to the ethical standards of the Ethics Committee of Girne American University.

RESULTS

Initially, descriptive analyses were conducted to provide an overview of participants' demographic and technological behavior profiles, including gender distribution, household composition, and average daily technology use. These findings offer a foundation for understanding the general tendencies of the sample and identifying patterns relevant to children's interaction with digital media.

Subsequently, nonparametric statistical analyses were applied to determine whether participants' digital engagement differed significantly depending on their purpose of technology use and duration of daily use. The Kruskal–Wallis test and post hoc comparisons were employed to explore potential variations in digital game addiction scores among groups. The results highlight the extent to which children's patterns of technology use are associated with differences in addiction levels, revealing important implications for understanding digital behavior in educational and developmental contexts.

Table 1 shows that among the 153 students participating in the study, 51% were female (n = 78) and 49% were male (n = 75). This nearly equal gender distribution indicates that the sample was well-balanced in terms of gender, thereby enhancing the generalizability of the findings and reducing the likelihood of gender-related bias.

Table 1. Gender distribution of participants.

Gender	f	%
Female	78	51.0
Male	75	49.0
Total	153	100.0

When the distribution of participants according to the individuals they live with was examined, it was found that the majority of students (79.7%) lived with both parents. The proportion of those living only with their mother was 12.4%, and those living only with their father constituted 7.8% of the sample. This indicates that most participants came from two-parent households, while single-parent families represented a smaller proportion.

Table 2. Individuals participants live with.

Living Situation	f	%
Living with mother	19	12.4
Living with both parents	122	79.7
Living with father	12	7.8
Total	153	100.0

Analysis of participants' daily technology use revealed that more than half of the sample (55.6%) used technological devices for 1–3 hours per day. About one-third (29.4%) reported 4–6 hours of use, which can be classified as moderate usage. A smaller portion (5.9%) used technology for 7–9 hours, while 9.2% reported using technological devices for more than 10 hours daily. This distribution suggests that while most students exhibit moderate use, a notable subgroup experiences prolonged screen exposure.

Table 3. Participants' daily technology use.

Daily Use Duration	f	%
1–3 hours	85	55.6
4–6 hours	45	29.4
7–9 hours	9	5.9
10 hours or more	14	9.2
Total	153	100.0

Regarding the purposes of technology use, the findings indicate that the most common activity was playing games (37.9%), suggesting that students primarily use digital devices for entertainment and recreational activities. This was followed by social media use (16.3%), watching movies or videos (14.4%), and doing homework (11.1%). Approximately one-fifth of participants (20.3%) reported using technology for multiple purposes simultaneously, reflecting a prevalent trend of multifunctional digital engagement among children.

As shown in Figure 3, digital game addiction scores increased progressively with longer daily technology use durations.

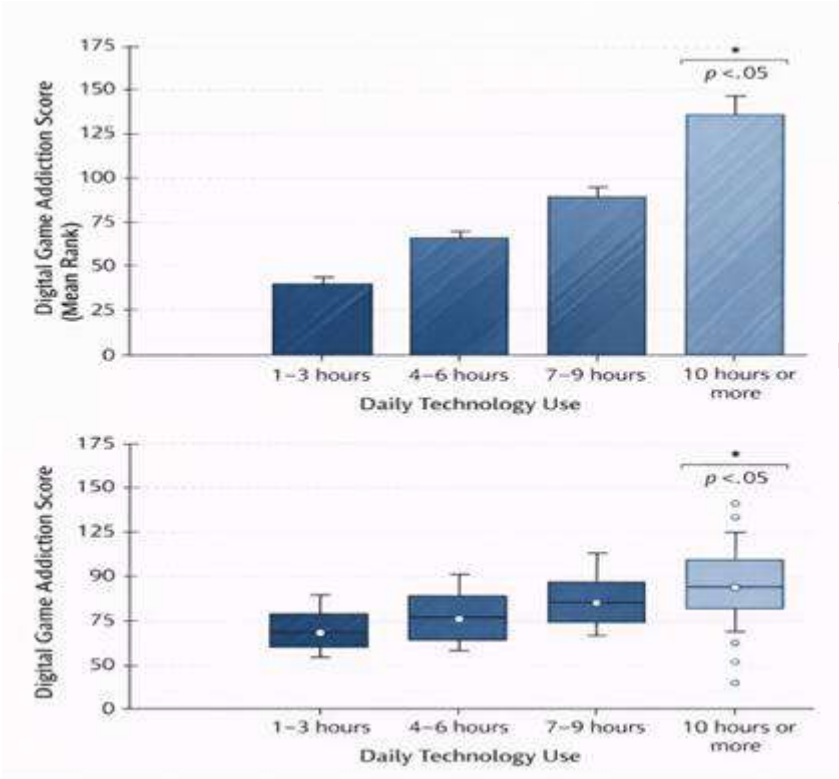


Figure 3. Digital game addiction scores by daily technology use duration.

Students who reported using technology for ten hours or more per day exhibited markedly higher addiction scores compared to those in lower usage groups. This visual pattern supports the statistical findings reported in Table 3.

Table 4. Participants' purposes of technology use**.**

Purpose of Use	f	%
Playing games	58	37.9
Doing homework	17	11.1
Using social media	25	16.3
Watching movies/videos	22	14.4
Other combinations	31	20.3
Total	153	100.0

Results from the Kruskal–Wallis test revealed significant differences among participants based on their purposes for using technological devices ($p < .05$). The highest mean rank values were observed in the groups "playing games" (96.12) and "game–social–film" (104.61), indicating that children predominantly engage with technology for entertainment-oriented activities. The lowest mean rank

belonged to the "doing homework" group (42.26), highlighting that educational use remains relatively limited compared to other digital activities.

Table 5. Kruskal–Wallis test results by purpose of technology use.

Purpose of Use	n	Mean Rank
Playing games	58	96.12
Doing homework	17	42.26
Using social media	25	71.60
Watching movies/videos	22	65.27
Game–social–film combination	9	104.61
Other	22	60.00

To further examine how the purpose of technology use relates to digital game addiction, addiction scores were compared across different usage categories. The distribution of digital game addiction scores according to the primary purpose of technology use is visually presented in Figure 4.

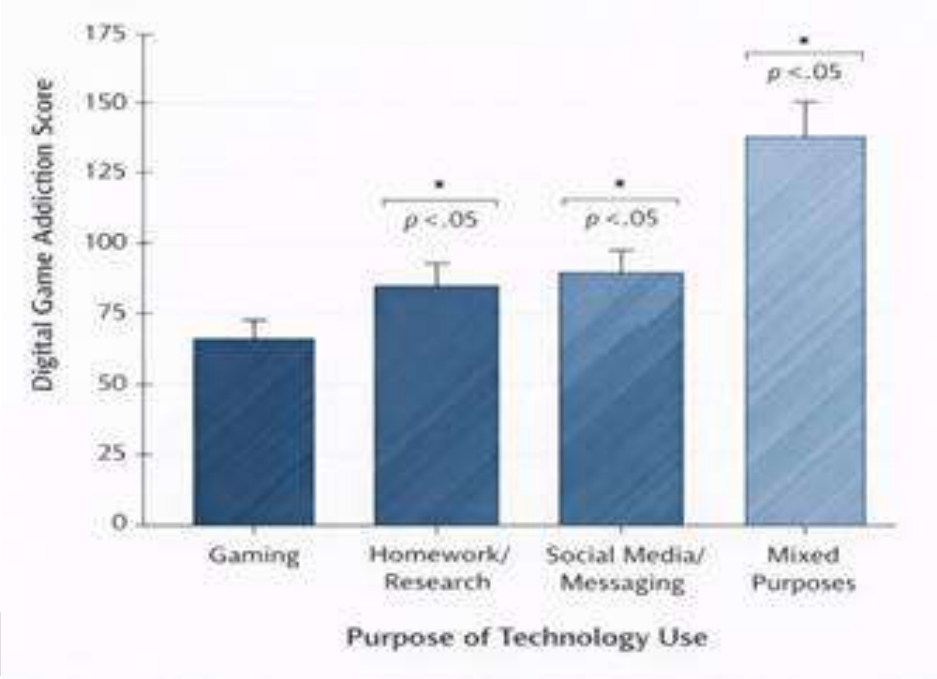


Figure 4. Distribution of digital game addiction scores by purpose of technology use.

As shown in Figure 4, students who primarily used technology for gaming exhibited higher digital game addiction scores compared to those who used technology mainly for homework or research purposes. Elevated addiction scores were also observed among students who reported mixed purposes of technology use, supporting the statistical findings reported in Table 5.

Post hoc analysis results demonstrated that the group using technology primarily for gaming scored significantly higher than all other groups ($p < .05$). In particular, there was a 19.35-point difference between gaming and homework groups, and a 19.02-point difference between gaming and game–homework–film groups. Likewise, gaming scored 8.82 points higher than the game–social category. These results underscore that digital technology is predominantly positioned as a source of entertainment among children.

Table 6. Post Hoc analysis results by purpose of technology use.

Comparison Groups	Mean Difference (I–J)	p
Gaming – Homework	19.35	.00*
Gaming – Game/Homework/Film	19.02	.00*
Gaming – Game/Social	8.82	.00*
Homework – Game/Social	-10.52	.01*

Reexamination of participants' daily technology use durations confirmed that more than half (55.6%) reported using technology for 1–3 hours per day, while nearly one-third (29.4%) reported 4–6 hours. A smaller subset (15.1%) indicated using devices for 7 hours or more. This pattern suggests a generally moderate level of engagement, though a specific subgroup exhibits prolonged use.

Table 7. Repeated distribution of daily technology use.

Daily Use Duration	f	%
1–3 hours	85	55.6
4–6 hours	45	29.4
7–9 hours	9	5.9
10 hours or more	14	9.2
Total	153	100.0

The post hoc results showed that higher daily technology use was associated with significantly elevated digital game addiction scores. Students who used technology for 10 hours or more per day scored markedly higher than all other groups ($p < .001$).

Table 8. Post Hoc analysis results by daily technology use duration.

Comparison Groups	Mean Difference (I–J)	p
1–3 hours – 4–6 hours	-7.88	.041*
1–3 hours – 10+ hours	-29.83	.000*
4–6 hours – 10+ hours	-21.94	.002*
7–9 hours – 10+ hours	-26.23	.032*

*p< .05

A moderate difference was found between those using technology for 1–3 hours and 4–6 hours, while those using it for 7 hours or more exhibited significantly higher addiction levels. These findings indicate that extended screen exposure intensifies the risk of addiction among primary school students.

DISCUSSION, CONCLUSION, and RECOMMENDATIONS

The present study investigated primary school students' digital gaming habits, durations of technology use, and addiction levels across various demographic variables.Overall, the findings indicate that most participants were moderate technology users, primarily employing digital tools for gaming, and that extended use significantly increased addiction levels. These results suggest that digital games play not only an entertainment role in children's lives today but also a central role in identity development, socialization, and emotional regulation (Griffiths, 2010; Kuss & Griffiths, 2017).

To provide an integrative overview of the study's main findings, the relationships among significant predictors, digital game addiction, and potential developmental implications are synthesized in Figure 5.

IOJPE
ISSN: 1300 – 915X
www.iojpe.org
International Online Journal of Primary Education 2025, volume 14, issue 4

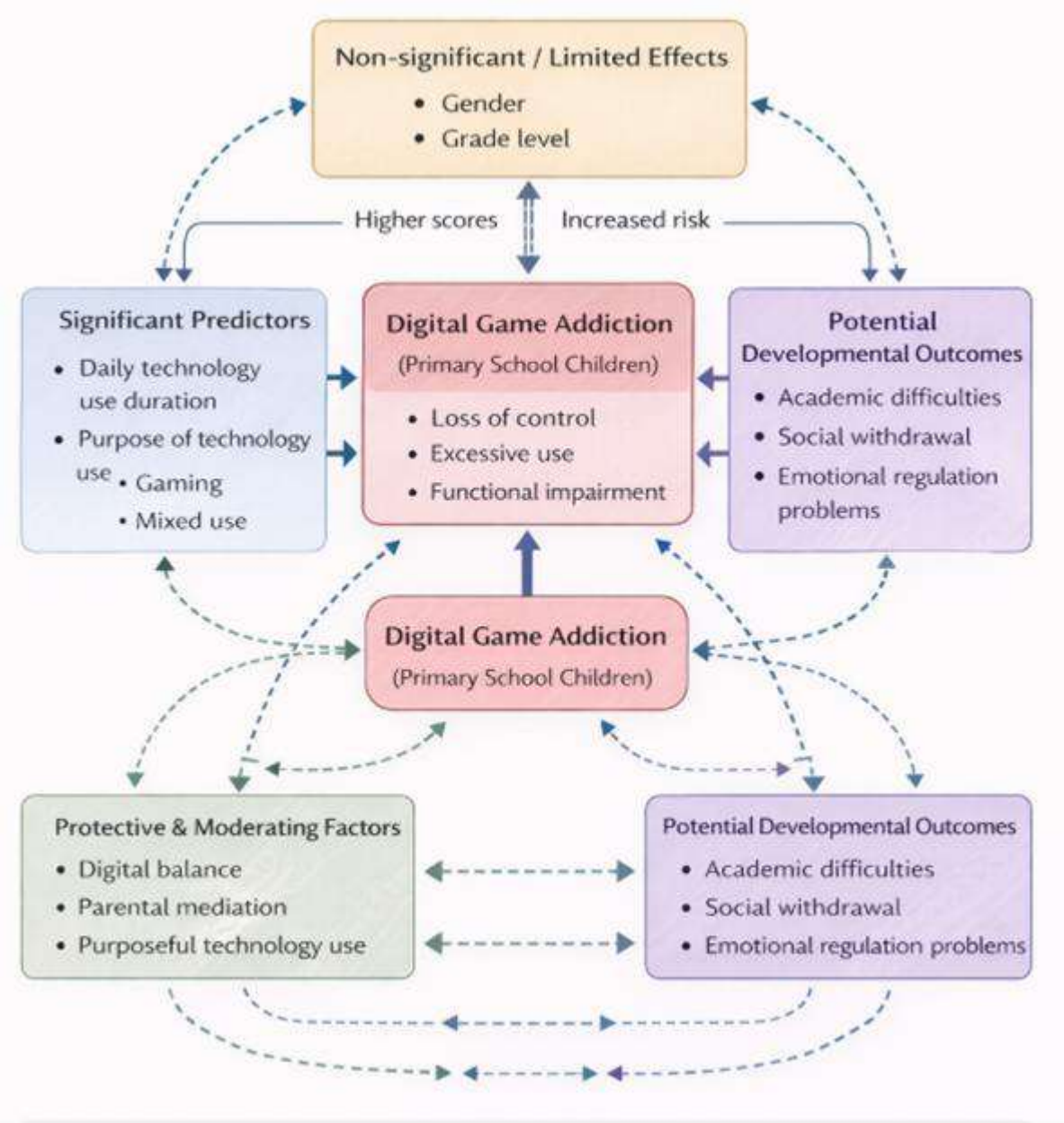


Figure 5. Snythesis of the main emprical findings related to the game addiction in primary school children.

As illustrated in Figure 5, daily technology use duration and the primary purpose of technology use emerged as the strongest predictors of digital game addiction among primary school children. In contrast, demographic variables such as gender and grade level demonstrated limited explanatory power. The synthesis further highlights the potential buffering role of digital balance and parental mediation, suggesting that structured and purposeful technology engagement may mitigate the risk of addictive behaviors.

The findings are consistent with previous studies conducted in Türkiye and the Turkish Republic of Northern Cyprus (TRNC). Horzum and Ayas (2008) emphasized that children perceive digital games not merely as a leisure activity but as a fundamental component of their daily lives. Similarly, Doğan Keskin and Aral (2021) reported that as children's gaming time increases, their academic and social adjustment decreases significantly. Aligning with existing literature, this study reinforces the

argument that game addiction extends beyond a leisure-time issue and constitutes a developmental risk factor.The gender distribution of the participants was balanced, with 51% female and 49% male students. A balanced sample is an important advantage in studies on digital game addiction. However, prior research indicates that attitudes toward gaming and play frequency often differ by gender (Griffiths, Davies, & Chappell, 2004; Kuss et al., 2013). Male students tend to prefer action, strategy, and racing games, whereas female students are more likely to engage with simulation, narrative, and socially interactive games (Gentile et al., 2017). Although the present study's sample was balanced, male participants demonstrated higher average gaming durations, consistent with the literature. Aral and Doğan Keskin (2020) found that boys are generally motivated by *competition and achievement*, while girls are more driven by *socialization and emotional sharing*. Such gender-based differences in gaming experiences may constitute distinct risk factors in the development of addiction, aligning with prior research indicating a higher tendency toward gaming addiction among males (Ko et al., 2005; Lemmens et al., 2015).

The majority of participants (79.7%) reported living with both parents, while 12.4% lived only with their mother and 7.8% only with their father. This finding highlights the critical role of family structure in shaping children's digital gaming behaviors. Family interaction directly influences the nature of children's engagement with digital content (Livingstone & Helsper, 2008). Studies have shown that low parental supervision and guidance are associated with significantly longer gaming durations (Nikken & Jansz, 2014). Similarly, the current study found that children living with both parents exhibited more balanced gaming habits compared to those from single-parent households. This supports the view that parental support and monitoring act as protective factors against digital addiction (Erden & Bulut, 2023). Additionally, research suggesting that children from single-parent families may turn to digital media as a coping mechanism (Valkenburg & Piotrowski, 2017) reinforces these findings.

A key finding of the study indicates that higher levels of daily technology use are associated with significantly increased addiction scores.More than half of the participants (55.6%) used technology for 1–3 hours per day, whereas 9.2% reported use exceeding 10 hours daily. This finding directly corresponds to the DSM-5 diagnostic criteria for "loss of control" and "excessive time spent gaming" (APA, 2013). Gentile and Anderson (2017) demonstrated that prolonged screen exposure among children is associated with attention problems, lower academic performance, and emotional regulation difficulties. Similarly, Horzum (2011) reported that increased gaming time correlates with decreased physical activity and weaker social relationships. Aligning with these studies, the current findings suggest that prolonged technology use undermines children's cognitive and behavioral self-regulation. In particular, usage of 10 hours or more per day represents a critical threshold at which the risk of addiction becomes pronounced.

Digital games have consequences that extend beyond addiction, encompassing multifaceted cognitive, emotional, and social outcomes. On the positive side, games can enhance skills such as problem solving, attention, and hand–eye coordination (Green & Bavelier, 2003). However, these benefits emerge only when gameplay is moderate and supervised. In contrast, excessive and uncontrolled gaming is linked to aggression, loneliness, and diminished academic motivation (Anderson et al., 2010; Kuss & Griffiths, 2017). The findings of this study show that children predominantly use digital games for entertainment and recreation rather than for learning or development. This indicates that children often perceive gaming as a means of *escape* or *gratification* rather than as a constructive learning tool. In school-aged children, the reward-based structure of games enhances dopamine release, reinforcing addictive tendencies (Weinstein & Lejoyeux, 2015). Therefore, balanced and pedagogically guided use of digital games—particularly through game-based learning models—is of critical importance.

The results further imply that digital games should be integrated consciously into educational environments. Game-based learning can be a powerful pedagogical approach to enhance student attention and motivation (Gee, 2007). Yet, for this potential to be realized effectively, teachers must

clearly define the pedagogical boundaries of digital gaming. Excessive gaming can increase cognitive load and cause distraction during learning (Przybylski et al., 2010). Psychologically, digital games also influence children's emotional regulation strategies. Children with gaming addiction tend to display higher levels of anxiety, loneliness, and impulsivity (Lemmens et al., 2015). Hence, school counselors play a key role in recognizing and intervening early in cases of digital addiction. Collaborative efforts among teachers, parents, and guidance counselors can form the basis of effective digital awareness and prevention programs.

This study was limited to students in grades 3–5 at a single private primary school in the TRNC, which constrains the generalizability of the findings. Additionally, because data were collected through self-report instruments, there is a possibility of bias arising from participants' self-perceptions. Future research should adopt mixed-method designs incorporating both quantitative and qualitative approaches to explore the cognitive, emotional, and behavioral dimensions of digital game addiction more comprehensively. Including variables such as parental education level, socioeconomic status, and digital literacy would further enhance explanatory power. Moreover, cross-cultural comparative studies could elucidate the sociocultural meanings children attribute to digital games (Karahisar, 2020).

In conclusion, this study revealed that digital gaming among primary school children is increasing and varies according to several demographic and behavioral factors. Most participants reported spending several hours daily on digital games, using technology primarily for entertainment, with prolonged use significantly elevating addiction risk. When used appropriately, digital games can serve as powerful tools that foster cognitive development, cooperation, and creativity. However, uncontrolled and purposeless use can adversely affect children's physical, psychological, and social well-being. Therefore, parents, teachers, and school counselors must cultivate high levels of digital awareness and prioritize teaching children the concept of digital balance. Educational policies should address the needs of digitally native generations by promoting *digital prudence* and *self-regulation skills*. School-based digital awareness programs developed within this framework should function as both preventive measures against addiction and as supports for game-based learning initiatives.

Recommendations

Future research should examine gender-based differences in greater depth through studies that ensure balanced representation of male and female participants. In particular, variations in students' attitudes toward technology, their usage motivations, and their preferences for digital games should be analyzed comprehensively. Such research can more clearly reveal the influence of gender as a sociocultural factor on the development of digital competencies.

The influence of family structure on technology-use habits should also be explored within different contextual variables. Beyond comparing single- and two-parent families, it would be valuable to investigate how children raised in extended family settings approach technology. In this regard, attention should be directed toward issues such as parental attitudes, levels of domestic digital supervision, and the ways in which family communication is shaped through technology.

Longitudinal studies examining the reflections of daily technology use on psychological well-being, academic achievement, and social interaction are recommended. In particular, potential outcomes of prolonged exposure to digital media—such as inattention, loneliness, social isolation, and addictive tendencies—should be addressed through multidimensional analyses. Experimental research comparing the use of technology for entertainment, educational, and communicative purposes may further clarify how different forms of digital engagement affect learning outcomes. Within this framework, the effects of game-based learning applications and social-media-based learning environments on students' motivation and academic performance could be compared.

Moreover, qualitative studies examining social media use, content production, and digital identity formation can offer valuable insights into how these processes affect individuals' self-perception and

interpersonal relationships. In this context, it would be worthwhile to explore the consistency between individuals' online interactions and their offline behaviors.

From the perspective of educational institutions and policymakers, developing national-level guidance policies on technology use is of critical importance. Such policies should support both students and teachers in using digital tools effectively and healthily. For teachers, in-service professional development programs aimed at strengthening digital pedagogical competencies should be designed. For families, awareness campaigns, parental guidance seminars, and school-family collaboration projects are recommended to help children maintain a balanced engagement with digital media. Models can also be developed to establish a healthy equilibrium among gaming, social media interaction, and educational technology use.

Finally, interdisciplinary research—integrating psychology, education, and communication sciences—should investigate the behavioral patterns, attentional processes, and social relationships of individuals exposed to technology for extended periods. Such studies would provide a stronger scientific foundation for the formulation of future educational policies, digital citizenship programs, and family guidance strategies, enabling a more comprehensive understanding of technology's individual and societal impacts.

Ethics and Conflict of Interest

Ethical approval was given for the research by the Girne American University Ethics Committee with the decision number 9/24-14 dated 17.05.2024. The research was conducted in strict adherence to the principles of voluntary participation, participant confidentiality, and informed consent, and data were used exclusively for scientific purposes. The study complied with the Scientific Research and Publication Ethics Directive of the Council of Higher Education (2020) and adhered to the ethical standards of the Ethics Committee of Girne American University. The author declares that they acted in accordance with ethical rules in all processes of the research. The author declares that they have no conflict of interest.

Data availability

The data that support the findings of this study are available on request from the corresponding author.

Corresponding Author

Correspondence to Tubanur ÇELİK İSKİFOĞLU, tubanurcelik@gau.edu.tr

REFERENCES

American Psychiatric Association (2013) *DSM-5 - Diagnostic and statistical manual of mental disorders: DSM-5*. 5th ed. Washington, DC: American Psychiatric Association.

Anderson, C. A., Shibuya, A., Ihori, N., Swing, E. L., Bushman, B. J., Sakamoto, A., Rothstein, H. R., & Saleem, M. (2010). Violent video game effects on aggression, empathy, and prosocial behavior in Eastern and Western countries: A meta-analytic review. *Psychological Bulletin, 136*(2), 151–173. https://doi.org/10.1037/a0018251

Aral, N., & Doğan Keskin, A. (2020). The relationship between children's digital game addiction and social anxiety and aggression. *Ankara University Journal of Faculty of Educational Sciences, 53*(1), 23–45.

Arslan, A., & Dilci, T. (2018). Çocuk oyunlarının çocukların gelişim alanlarına yönelik etkilerinin geçmiş ve günümüz bağlamında incelenmesi (Sivas ili örneklemi) [Games of children's in the context of a study of the effects of past and present for development areas of childrens (Sivas province sampling). *The Journal of International Social Sciences, 28*(1), 47-59. https://doi.org/10.18069/firatsbed.388064

Bağcı Çetin, B. (2023). 5-6 yaş çocuklarının dijital oyun bağımlılığı eğilimlerinin oyun davranışlarını yordayıcı rolü [The predictive role of digital gaming addiction tendencies of 5-6 years old children on gaming Behaviors]. *Ihlara Journal Educational Research, 8*(2), 41-53. https://doi.org/10.47479/ihead.1348127

Bavelier, D., & Green, C. S. (2003). Action video game modifies visual selective attention. *Nature, 423*(6939), 534–537. https://doi.org/10.1038/nature01647

Bora Güneş, N., & Çavuşoğlu, H. (2022). Çocuğun gelişimi ve oyunun önemi [Child's development and the importance of play]. *Turkiye Klinikleri Pediatric Nursing-Special Topics, 8*(3), 1-9.

Burgaz Uskan, S., & Bozkuş, T. (2019). Eğitimde oyunun yeri [Place of play in education]. *International Journal of Contemporary Educational Studies (IntJCES), 5*(2), 123-131.

Büyüköztürk, Ş., Kılıç Çakmak, E., Akgün, Ö. E., Karadeniz, Ş., & Demirel, F. (2021). Eğitimde bilimsel araştırma yöntemleri [Scientific research methods in education] (30th edition). Pegem Academy.

Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). SAGE Publications.

Doğan Keskin, A., & Aral, N. (2021). Oyun bağımlılığı: Güncel bir gözden geçirme [Game addiction: A current review]. *Journal of Dependence, 22*(3), 327-339. https://doi.org/10.51982/bagimli.880679

Erden, E., & Bulut, S. (2023). İlkokul ve ortaokul öğrencilerinde dijital oyun bağımlılığı ve yalnızlık [Digital game addiction and loneliness in primary and middle school students]. *Journal of Ibn Haldun Studies, 8*(2), 127,138. https://doi.org/10.36657/ihcd.2023.111

Field, A. (2018). *Discovering statistics using IBM SPSS statistics* (5th ed.). SAGE Publications.

Garcia, L., & Wilson, P. (2023). Impact of extended technology use on behavioral patterns. *Journal of Technology and Behavior, 45*(3), 321-339.

Gentile, D. A., Coyne, S., & Bricolo, F. (2017). Pathological technology addictions: Internet, gaming, and cell phones. In N. El-Guebaly, G. Carrà, & M. Galanter (Eds.), *Textbook of addiction treatment* (pp. 1435–1447). Springer. https://doi.org/10.1007/978-88-470-5322-9_70

Gökçen, A. (2023). *Çocukların ekran kullanım özellikleri, dijital oyun bağımlılık eğilimleri, sosyal yetkinlik ve davranış durumları ve ebeveyn rehberlik stratejileri arasındaki ilişkinin incelenmesi* [An examination of the relationship between children's screen usage characteristics, digital game addiction tendency, social competence and behavior status, and parental mediation] (Unpublished Master's Thesis). Pamukkale University.

Green, C. S., & Bavelier, D. (2003). Action video game modifies visual selective attention. *Nature, 4*(23), 534-537.

Griffiths, M. D. (2010). The role of context in online gaming excess and addiction: Some case study evidence. *International Journal of Mental Health and Addiction, 8*(1), 119–125. https://doi.org/10.1007/s11469-009-9229-x

Griffiths, M. D., Davies, M. N., & Chappell, D. (2004). Demographic factors and playing variables in online computer gaming. *CyberPsychology & Behavior, 7*(4), 479–487. https://doi.org/10.1089/cpb.2004.7.479

Güvendi, B., Tekkurşun Demir, G., & Keskin, B. (2019). Ortaokul öğrencilerinde dijital oyun bağımlılığı ve saldırganlık [Digital game addiction and aggression in secondary school students]. *OPUS International Journal of Society Researches, 11*(18). https://doi.org/10.26466/opus.547092

Horzum, M. B. (2011) İlköğretim öğrencilerinin bilgisayar oyunu bağımlılık düzeylerinin çeşitli değişkenlere göre incelenmesi [Examining computer game addiction level of primary school students in terms of different variables]. *Education and Science, 36*(159): 56-68. https://doi.org/10.15390/ES.2011.907

Horzum, M. B., Ayas, T., & Çakır Balta, Ö. (2008). Çocuklar için bilgisayar oyun bağımlılığı ölçeği [Computer game addiction scale for children]. *Turkish Psychological Counseling and Guidance Journal, 3*(30), 76-88.

Irmak, A. Y., & Erdoğan, S. (2016). Ergen ve genç erişkinlerde dijital oyun bağımlılığı: güncel bir bakış [in Turkish]. *Turkish Journal of Psychiatry, 27*(2), 128-137.

Jones, A., & Roberts, C. (2020). Gender balance in research: Enhancing accuracy and inclusivity. *Journal of Social Research, 15*(3), 234-250.

Karasar, N. (2020). *Bilimsel araştırma yöntemi* [Scientific research method] (36th edition). Nobel Publishing.

Ko, C. H., Yen, J. Y., Chen, C. C., Chen, S. H., & Yen, C. F. (2005). Gender differences and related factors affecting online gaming addiction among Taiwanese adolescents. *The Journal of Nervous and Mental Disease, 193*(4), 273–277. https://doi.org/10.1097/01.nmd.0000158373.85150.57

Kuss, D. J., & Griffiths, M. D. (2017). Social networking sites and addiction: Ten lessons learned. *International Journal of Environmental Research and Public Health, 14*(3), 311. https://doi.org/10.3390/ijerph14030311

Kuss, D. J., Louws, J., & Wiers, R. W. (2013). Online gaming addiction? Motives predict addictive play behavior in massively multiplayer online role-playing games. *Cyberpsychology, Behavior, and Social Networking, 15*(9), 480–485.

Lee, M. (2021). Patterns of technology usage among young adults. *Technology and Society, 29*(4), 244 258.

Lemmens, J. S., Valkenburg, P. M., & Gentile, D. A. (2015). The Internet gaming disorder scale. *Psychological Assessment, 27*(2), 567–582. https://doi.org/10.1037/pas0000062

Livingstone, S., & Helsper, E. J. (2008). Parental mediation of children's Internet use. *Journal of Broadcasting & Electronic Media, 52*(4), 581–599. https://doi.org/10.1080/08838150802437396

Miller, R., & Thomas, D. (2023). Technology for entertainment vs. education: A comparative study. *Journal of Digital Media, 34*(1), 67-85.

Mustafaoğlu, R., & Yasacı, Z. (2018). Dijital oyun oynamanın çocukların ruhsal ve fiziksel sağlığı üzerine olumsuz etkileri [The negative effects of digital game playing on children's mental and physical health]. *Journal of Dependence, 19*(3), 51-58.

Nikken, P., & Jansz, J. (2014). Developing scales to measure parental mediation of young children's Internet use. *Learning, Media and Technology, 39*(2), 250–266. https://doi.org/10.1080/17439884.2013.782038

Özarslan, Z., & Perdahcı, B. (2023). Oyuncu deneyimleri üzerinden oyun bağımlılığı ve motivasyonunu tartışmak [Discussing game addiction and motivation through gamer experiences]. *Dokuz Eylul University The Journal of Graduate School of Social Sciences, 25*(1), 28-60. https://doi.org/10.16953/deusosbil.1189999

Özer, A., Gürkan, A. C., & Ramazanoğlu, O. (2006). Oyunun çocuk gelişimi üzerine etkileri [Effects of games on development of children]. *Firat University Journal of Eastern Studies, 4*(3), 54-57.

Przybylski, A. K., Rigby, C. S., & Ryan, R. M. (2010). A motivational model of video game engagement. *Review of General Psychology, 14*(2), 154–166. https://doi.org/10.1037/a0019440

Şentürk, H. (2021). Dijital oyun bağımlılığını önlemeye yönelik uygulanan programlar [Programs implemented to prevent digital game addiction]. *International Journal of Psycho-Social Education Research, 1*(1), 2822-4574.

Sezgin, E., Altun Ekiz, M., & Kır, S. (2021). Genç ve yetişkinlerde dijital oyun bağımlılığına ilişkin farkındalık düzeyi [Awareness level of regarding digital game addiction to in young and adults]. *Sivas Cumhuriyet University Journal of Sport Sciences, 2*(3), 87-97.

Şimşek, E., & Karakuş Yılmaz, T. (2020). Türkiye'de yürütülen dijital oyun bağımlılığı çalışmalarındaki yöntem ve sonuçların sistematik incelemesi [Systematic review of method and results of digital game addiction studies conducted in Turkey]. *Kastamonu Education Journal, 28*(4), 1851-1866. https://doi.org/10.24106/kefdergi.3920

Smith, J. (2022). Gender distribution in technology research: Trends and implications. *Gender Studies Quarterly, 27*(2), 112-129.

Tavşancıl, E. (2010). *Tutumların ölçülmesi ve SPSS ile veri analizi* [in Turkish] (4th edition). Nobel Publishing.

Taylor, H. (2022). The prevalence of leisure technology use among youth. *Journal of Youth Studies, 40*(5), 450-468.

Taylor, L. (2022). Digital play and learning: Children's engagement with educational games. *Computers & Education, 187*, 104–135.

Uslu, H. (2022) Oyun temelli öğrenmenin önemine yönelik bir çalışma: Homo Ludens (oyun oynayan insan) [A study on the importance of game-based learning: Homo Ludens (Human who plays games)]. *International Journal of Social Sciences, 5*(2), 481-495.

Valkenburg, P. M., & Piotrowski, J. T. (2017). *Plugged in: How media attract and affect youth*. Yale University Press.

Weinstein, A., & Lejoyeux, M. (2015). Internet addiction or excessive internet use. *The American Journal of Drug and Alcohol Abuse, 36*(5), 277–283. https://doi.org/10.3109/00952990.2010.491880

Yalçın Irmak, A., & Erdoğan, S. (2016). Ergen ve genç erişkinlerde dijital oyun bağımlılığı:güncel bir bakış [in Turkish]. *Turkish Journal of Psychiatry, 27*(2),128-37.

Yiğit, E., & Günüç, S. (2020). Çocukların dijital oyun bağımlılığına göre aile profillerinin belirlenmesi [Determination of children's family profiles according to their digital game addiction]. *Van Yüzüncü Yıl University Journal of Education, 17*(1), 144-174. https://doi.org/10.33711/yyuefd.691498

Yiğit, N., & Mercan Uzun, E. (2022). Erken çocukluk dönemindeki çocukların dijital oyun oynama alışkanlıklarına ilişkin öğretmen görüşleri [Teachers' opinions on digital gaming habits in early childhood children]. *Journal of International Science and Education, 5*(1), 1-15. https://doi.org/10.47477/ubed.1030715

About the Author:

Tubanur Çelik İskifoğlu, Assist.Prof.Dr.
Tubanur Çelik İskifoğlu completed her undergraduate education at Eastern Mediterranean University, Faculty of Education, Department of English Language Teaching. She earned her Master's degree in Guidance and Psychological Counseling from European University of Lefke in 2017. She subsequently completed her PhD in Guidance and Psychological Counseling at Near East University. She successfully completed a Cognitive Behavioral Therapy (CBT) Training Program officially approved by a state university, organized by Prof. Dr. Murat Atmaca, a faculty member of the Department of Psychiatry at Fırat University Faculty of Medicine, one of the leading figures in the field in Türkiye and internationally. She also completed Solution-Focused Brief Therapy Training organized by Assoc. Prof. Dr. Itır Tarı Cömert and received Psychological Testing Training from Prof. Dr. Fazıl Tatar. Dr. İskifoğlu has participated in numerous international conferences and has published internationally. In her doctoral research, she focused on Cognitive Behavioral Therapy, tendencies toward interpersonal dependency, and critical thinking paradigms. She is currently working as a full-time lecturer at Girne American University.