

## PLAY TO LEARN: A LITERATURE REVIEW ON PARENTAL INVOLVEMENT IN PLAY-BASED EARLY MATHEMATICS

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**Abstract.** The article looks at the link between parental attitudes and the practical application of play-based learning methodologies in early childhood mathematics instruction. Recognizing that early childhood is an important stage for establishing core cognitive and analytical skills, the study emphasizes the advantages of incorporating play into learning activities. While Malaysian educational policy and global research emphasize the importance of family involvement, there is still a disconnect between parents' confidence in the efficacy of play-based learning and its actual application. The study employs a mixed-methods approach, reviewing literature and surveying various stakeholders to identify challenges such as time limits, a lack of resources, and restricted collaboration among educators and parents. It also includes research from national and international contexts demonstrating the significance of environmental, psychological, and instructional elements in supporting early mathematical development. The findings recommend focused interventions that provide parents with resources, training, and support networks in order to improve children's mathematical learning experiences and outcomes through more consistent and informed home engagement.

**Keywords:** *parental perception, play-based learning, early mathematics education, early childhood education, parental involvement*

### Introduction

Mathematics in early infancy is more than just numbers, it is about developing cognitive structures that promote logical thinking, problem solving and analytical abilities that will be useful throughout life. Mathematics is not only a subject taught in schools, but with the current trends in education, mathematical skills have also become a potential career field in the future (Idris and Bacotang, 2023a; Idris et al., 2023b; Idris et al., 2023c). Children are most open to hands-on, pleasant and real-world relevant learning activities between the ages of four and six. Play-based learning has emerged as an effective educational method in this setting. It provides a natural and meaningful approach for youngsters to interact with basic mathematical ideas like forms, measuring and counting. Introducing young children to mathematics via play to improve their learning experience by making abstract concepts more approachable and fun (Farah and Suziyani, 2023). Play in early math education promotes motivation, curiosity and deeper understanding, an approach supported by educators and psychologists. Despite the educational potential of play-based learning, its implementation at home is heavily reliant on parents' views, expertise and degree of participation. The Malaysian Education Development Plan 2013-2025 (PPPM) emphasizes the critical role that parents play in ensuring their children's academic achievement, pushing for improved parent and teacher collaborations and fostering home-based literacy and numeracy

development. This is corroborated by data from the Programme for International Student Assessment (PISA), which shows that children do better academically when their parents actively participate in learning activities at home. Nonetheless, research indicates that, while parents strongly favour play-based techniques, their actual engagement is frequently restricted. Maisarah and Syaza (2021) report a high parental belief in play-based methods (mean=4.20), yet the participation rate in implementing these strategies at home is only moderate (mean=3.66), suggesting a significant gap between perception and practice.

This disparity poses various issues. Although many parents see the relevance of mathematics and value play as a form of learning, they still rely extensively on traditional materials like workbooks and worksheets. Such an approach is not only ineffective, but it may also contribute to increased stress and conflict at home. According to previous study, conventional homework frequently results in power conflicts and emotional strain between parents and children, particularly in families with various educational and financial backgrounds. Furthermore, parents may be unaware that math learning may be integrated into regular home tasks such as cooking, grocery shopping, or item sorting, all of which provide excellent learning opportunities without the need for formal teaching (Maisarah and Syaza, 2021). Compounding the problem is a lack of understanding and formal instruction on how to properly use play-based learning. Many parents lack access to necessary materials or are doubtful of their capacity to promote such learning. In certain circumstances, there is a breakdown in communication and collaboration between instructors and parents, making it difficult for families to reinforce school lessons at home. Alim and Zaini (2021) emphasize that without proper assistance and training, parents may feel unprepared to establish learning environments that promote mathematical investigation. Thus, while the potential of play-based learning is widely established, its practical use in home settings is underutilized and sometimes misinterpreted, necessitating specific interventions to provide parents with the essential information and resources. Given this limitation, this study looks into the link between parental views and the actual use of play-based learning strategies in early mathematics teaching at home. The research, which focuses on the Gombak region of Selangor, aims to measure parental trust in play-based learning, identify implementation problems and analyze how these views connect to real behaviours. The findings seek to provide empirical evidence for the development of effective parental involvement programs, as well as practical insight for educators and policymakers. Finally, increasing parents. The ability to include play into early learning at home may result in more meaningful educational experiences for children and improved long-term mathematics performance outcomes.

### ***Literature review***

Early mathematics education is increasingly viewed as more than just skill learning, but also as a basis for cognitive development, critical thinking, and lifelong problem solving. A increasing body of research identifies play-based learning as a highly successful technique for developing these skills in young children. Play, which is based on constructivism and sociocultural theory, allows youngsters to explore mathematical concepts in real-world, hands-on circumstances. Farah and Suziyani (2023) suggest that play makes abstract mathematical concepts more accessible and pleasant, enabling deeper engagement and intrinsic drive. Nevertheless, the successful implementation of play-based arithmetic learning, particularly at home, is strongly dependent on parental

involvement. The Malaysian Education Blueprint (2013-2025) and international evaluations such as PISA demonstrate that children do better when their parents actively support their education at home. Despite this, numerous studies (Alim and Zaini, 2021; Maisarah and Syaza, 2021) show a persistent gap between belief and practice: while parents overwhelmingly support the concept of learning through play, their actual implementation is limited due to time constraints, lack of confidence, and limited resources.

Research by Peixoto et al. (2024) as well as Radišić and Baucal (2024) shows that parental thinking has a major impact on children's attitudes about mathematics. Positive ideas promote achievement and motivation, but fixed or worried perspectives can harm student achievements. Malaysian studies have also identified useful aids, such as the "Math Addition Bag" and nature-based learning activities, that help bridge the theory-practice gap, improving both learning and parental confidence (Noraina et al., 2024; Nur and Norly, 2023). The literature regularly highlights systemic hurdles, such as poor parent-teacher collaboration, socioeconomic limits, and a general lack of systematic parent training. Frameworks such as Bronfenbrenner's Ecological institutions Theory stress the connectivity of a child's development to familial and educational institutions. As a result, providing parents with practical tools, clear instructions, and supportive relationships is critical to maintaining meaningful, play-based mathematics learning. Existing research shows that comprehensive, family-engaged, and play-based approaches are critical for improving early math experiences and guaranteeing long-term educational achievement.

## **Materials and Methods**

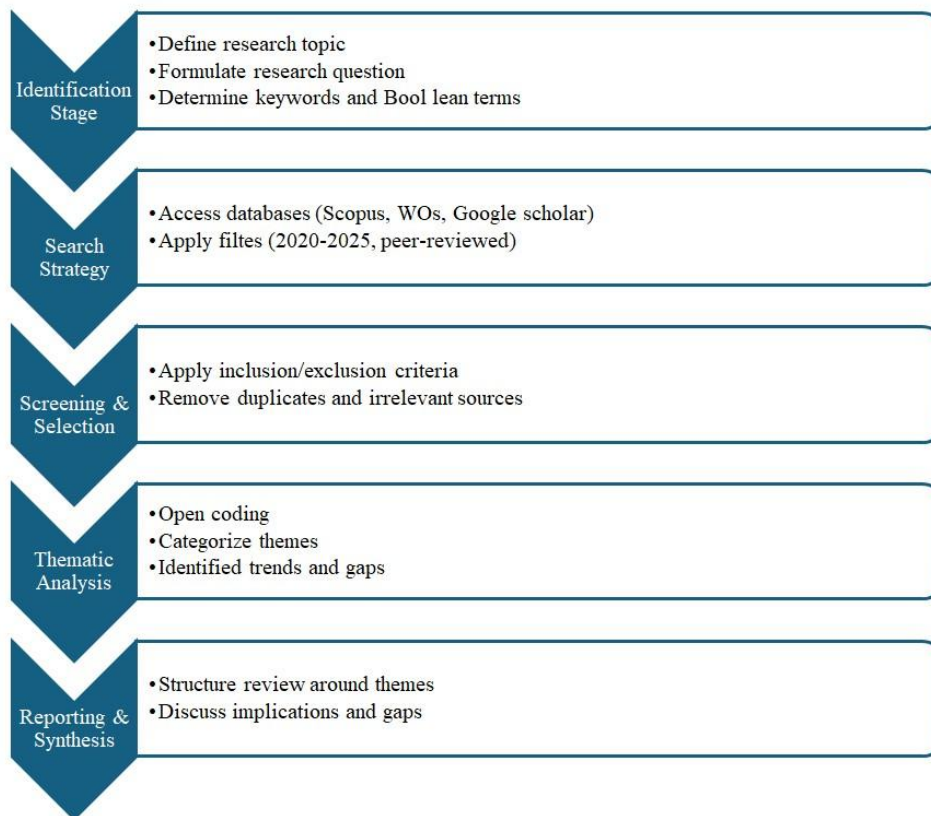
### ***Define research topic, search strategy and data source, inclusion and exclusion criteria***

This study used a qualitative literature review approach to investigate scholarly opinions and research trends connected to by define topic such as "mathematic and parental involvement". The methodology was based on a thorough search, selection, and thematic analysis of scholarly literature. A thorough search was carried out utilizing academic databases such as Scopus, Web of Science, Google Scholar, and ScienceDirect. Keywords such as "mathematics education," "early mathematics," "parental involvement," and "play-based learning mathematics" were used to locate relevant material. Only peer-reviewed journal papers, conference proceedings, and research reports published between 2020 and 2025 were considered. Articles were chosen based on their relevance to the research aims, methodological clarity, and the credibility of publication sources. Non-academic publications, editorials, and opinion papers were eliminated to maintain data quality.

### ***Data collection and analysis, validity and reliability***

Following an initial screening, 29 papers were picked and thoroughly reviewed. A thematic analysis technique was used to discover common themes, conceptual frameworks, findings, and research gaps. The selected literature was evaluated using open coding, and the data was organized into important areas such as academic accomplishment, professional paths, and instructional implications. To verify the validity and reliability of the literature evaluation, a systematic review matrix was used,

which allows for uniform data extraction and comparison. Triangulation was accomplished by cross-referencing several sources and opinions on the same topic (*Figure 1*).



**Figure 1.** Method using by researcher to analyze data.

## Results and Discussion

Several recent studies have highlighted the benefits of play-based and contextual learning techniques in improving early childhood mathematics instruction (*Table 1*). For example, Kim and Kim (2025) discovered that field observation during teacher training improved pre-services educators' awareness of young children's active participation in math learning. Similarly, interactive play has been demonstrated to dramatically increase children's number recognition and conceptual comprehension (Connie and Alley, 2021; Nurdiyana et al., 2021). Studies reaffirm the importance of play, demonstrating that instructors widely use this method because it improves learning results. Environmentally rich and hands-on environments can significantly influence children's motivation and success in mathematics (Tan and Norly, 2024; Farah and Suziyani, 2023). Radišić and Baucal (2024) found that utilising wooden blocks can raise children's involvement, whereas Noraina et al. (2024) demonstrated that nature-based learning activities can significantly improve accomplishment, with post-test scores going from 70.8% to 94%. Aside from instructional measures, family participation appears as a critical element determining early math achievement. Peixoto et al. (2024) found that parents' fixed mindsets hamper involvement, but positive attitudes generate more drive and accomplishment in children. Other studies conducted in other contexts,

including Kudat (Alim and Zaini, 2021), Melaka (Maisarah and Syaza, 2021), and Batu Pahat (Masyetah and Syaza, 2021) consistently revealed that parents believed in the efficiency of play-based learning and actively supported their children’s math education. Ngien et al. (2021) concluded from a comprehensive literature review that family support is one of the most significant factors in early academic achievement, however collaboration with schools remains an area that requires additional improvement. The data also shows that instructors’ view and preparation are critical to effective math education. Ji and Park (2024) emphasised the importance of metaphor analysis in understanding educators’ conceptualisations of effective teaching methods, but Tan and Norly (2024) found that experience levels had no significant effect on teachers’ strong knowledge of learning via play. Furthermore, items such as the “Math Addition Bag” garnered positive feedback from instructors, emphasising the necessity of engaging and well-designed teaching aid. However, some studies warn that unfavourable attitudes towards mathematics might impair children’s success, particularly in terms of long-term STEM participation. Norwaheda and Siti (2022) linked decreased interest in STEM in Malaysia to negative attitudes towards math, whereas Fekumo and Omeka (2022) discovered a substantial relationship between students’ parental and student perspective is crucial for improving outcomes. These findings corroborate a common narrative holistic, play-based and family engaged approach together with supportive surroundings and competent instructors, are critical for promoting mathematical thinking and excitement in early childhood education.

**Table 1.** Summary of key research on parental perceptions and play-based learning in early Mathematics.

A&Y	T/F	L/S	M	KF
Kim and Kim (2025)	Pre-service early childhood teachers about early math education as reflected in participant observation journals	20 students	Qualitative	Field observations give pre-service teachers a thorough grasp of early childhood mathematics education, including the role of children as active participants in learning maths, the significance of the learning environment and effective teaching strategies.
Rutkien and Narusaitiene (2024)	Attitudes of parents and teachers toward STEAM education in preschool	104 parents and 116 teachers	Quantitative (Survey)	Parents value a math and science background and recognize the benefits and challenges of STEAM.
Ji and Park (2024)	Teacher perception of good early child maths using metaphor analysis	South Korea (parents)	Mixed method	The role of early childhood educators in providing successful early maths teaching through analysis metaphors.
Peixoto et al. (2024)	Parental beliefs and children’s math motivation	Europe (80,071 participants)	Quantitative (SEM analysis)	Fixed mindsets diminish involvement, whereas positive attitudes increase motivation and performance.
Radišić and Baucal (2024)	Motivation and use of wooden blocks in early math education	Europe (6 countries)	Longitudinal study (MATHMout project)	Motivation is linked to the environment and individual characteristics, play materials such as blocks can boost involvement.
Noraina et al. (2024)	Nature-based learning effectiveness in early math achievement	Malaysia (25 preschoolers)	Experimental (Pre-Post Test)	Post-test scores improved significantly from 70.8% to 94% confirming the effectiveness of nature based learning activities.
Shone et al. (2024)	Students perception of mathematics	Nepal (Secondary students)	Mix methods	Positive perception improves learning outcomes.
Tan and Norly (2024)	Teachers strategies in early math	Kuantan, Pahang (Preschool teachers)	Quantitative	Teachers have a high knowledge of learning via play in maths learning and this is not altered by experiences.
Khasanah and	Development of numeracy literacy in maths and daily life	Journals	Literature research	Numeracy literacy can be achieved by buying and selling as seller and

Purnamasari (2023)					purchasers.
Atlar and Uzuner (2023)	Teacher development about literacy in children with hearing loss	Turkey (preschoolers)	Qualitative		Significant impact of play-based learning, discipline and parental involvement.
Nur and Norly (2023)	Analysis of needs "Math Addition Bag" teaching tool	Bachok, Kelantan (32 preschool teachers)	Quantitative (Survey, SPSS v20)		Strong support for engaging math tools (M = 4.75) means positive feedback from educators.
Farah and Suziyani (2023)	Identify the implementation of a play approach in maths education	Tangkak, Johor (49 teachers)	Quantitative (Survey, SPSS v26)		Implementing play methods improves teaching and learning.
Alim and Zaini (2023)	Parental perception of math learning through play at home	Kudat, Sabah (63 parents)	Quantitative (Survey, SPSS v25)		Very high belief (M = 4.45), moderate constraint (M = 3.21), very high involvement (M = 4.31)
Sedek and Zaini (2021)	Learning through play and child development	Pahang (150 Parents)	Quantitative (Survey, SPSS v25)		Very high perception: cognitive (M = 4.50), physical (M = 3.80), socioemotional (M = 4.64).
Naldo et al. (2023)	Learn while play in class	Sandakan (10 students)	Qualitative		Play allows youngsters to grow and strengthen their creativity and imagination.
Norwahe da and Siti (2022)	Decline in STEM interest in Malaysia	Malaysia (STEM data focused)	Quantitative		Negative math perceptions lower STEM participation.
Fekumo and Omeka (2022)	Influence of students math perception on academic performance	Nigeria (170 students)	Ex-post facto, Survey and SPSS		Confidence, teacher support and parental beliefs impact achievement: strong correlation between perception and performance.
Jo and Son (2022)	Investigate how learning methods that combine kitchen activities might improve maths.	Preschool students	Mixed methods		Cooking activities can improve mathematics positively.
Maisarah and Syaza (2021)	Parental perception of play-based math learning	Durian Tunggal, Melaka (Parents)	Quantitative (Survey SPSS v30)		High trust in play-based learning (M = 4.20), moderate involvement (M = 3.66), low constraints (M = 2.76)
Masyetah and Syaza (2021)	Parental perception of play-based learning	Batu Pahat (45 parents)	Quantitative (PPBS Scale adapted)		Parents feel play promotes child development, and substantial engagement was noticed.
Ngien et al (2021)	Systematic review: parental involvement and academic performance	40 reviewed articles	Systematic Literature Review (PRISMA)		Parents' support at home is most influential and collaboration with schools is still under discussion.
Nurdiyana et al. (2021)	Use of interactive play for early math learning	Malaysia (2 children)	Qualitative (Case Study)		Interactive games improved recognition and understanding of numbers.
Connie and Alley (2021)	Math games for preschoolers	Malaysia	Theoretical (Conceptual Review)		Games can enhance engagement: based on constructivism Vygotsky support learning through experience
Khowaja and Kang (2021)	Perceptions of ECED in the Pakistani play context	Pakistan (100 parents)	Quantitative (Survey, SPSS)		Positive views on ECED: play and family involvement are considered beneficial.
Nor et al. (2021)	Play therapy through an islamic approach	Books, Journals, Al-Quran, Articles and Hadis	Qualitative		Play therapy is not new, it has long been performed in islam as part of the care method recommended by the Prophet Muhammad.
Apriyani (2021)	Play strategies in ECE are important	Library	Library research		Improved intellectual and emotional well-being.
Ester and Giamulia (2021)	Playing is a method for children's learning	Indonesia	Qualitative		Playing methods can help children understand.
Konca and İlhan (2021)	Parents' views on preschool education	Turkey (11 parents)	Qualitative (Interviews)		Positive views on skills gained through ECE where concerns over cost and cultural fit.
Ng et al. (2020)	Perceptions of holistic early childhood education	Hong Kong (1,383 parents and 165 educators)	Quantitative and Policy Analysis		Alignment between parental expectations and Hong Kong's HECE framework.

Rahimah (2020)	Numeracy through play	Malaysia (55 students and teachers)	Qualitative	Hands-on activities and meaningful play build numeracy skills.
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*Note: A&Y=Authors & Year; T/F=Title/Focus; L/S=Location/Sample; M=Methodology; KF=Key Finding.*

## Conclusion

The study confirms that, while parents in Gombak and elsewhere strongly favor play-based learning for early mathematics education, their actual participation is uneven due to a variety of structural and perceptual obstacles. Despite broad recognition of play as an effective learning medium, which is supported by educators, psychologists, and empirical data, parental efforts are frequently hampered by a lack of guidance, insufficient resources, and limited collaboration with educators. The literature and findings emphasize that meaningful early math experiences necessitate a combination of supportive home situations, committed instructors, and systematic resource allocation. The study finds that it is critical to close the gap between parental perceptions and practice through targeted interventions, community training programs, and school-home collaborations. Such tactics not only help young students develop a deeper knowledge of mathematics, but they also contribute to long-term academic achievement and improved engagement in STEM-related courses.

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## Conflict of interest

The authors confirm that there is no conflict of interest involve with any parties in this research study.

## REFERENCES

- [1] Alim, M.M., Zaini, S.H. (2021): Persepsi ibu bapa terhadap kaedah bermain dalam pembelajaran matematik awal kanak-kanak di rumah: Parent's perception on playing method in early childhood mathematics at home. – *Jurnal Pendidikan Awal Kanak-kanak Kebangsaan* 10(2): 1-15.
- [2] Apriyani, N. (2021): Metode bermain dalam pembelajaran anak usia dini. Raudhatul Athfal. – *Jurnal Pendidikan Islam Anak Usia Dini* 5(2): 126–140.
- [3] Atlar, H., Uzuner, Y. (2023): Supporting teacher development about early literacy in children with hearing loss: an action research in Turkey. – *European Journal of Special Education Research* 9(2): 92-121.
- [4] Connie, C.O., Alley, E. (2021): Permainan matematik untuk kanak-kanak prasekolah. – *Malaysian Journal of Social Sciences and Humanities (MJSSH)* 6(11): 181-189.
- [5] Ester, E., Giamulia, D.S. (2021): Metode bermain salah satu metode pembelajaran untuk anak. *Veritas Lux Mea*. – *Jurnal Teologi dan Pendidikan Kristen* 3(1): 35-45.
- [6] Farah, N.O., Suziyani, M. (2023): Pelaksanaan pendekatan bermain dalam pengajaran dan pembelajaran matematik awal. – *Malaysian Journal of Social Sciences and Humanities (MJSSH)* 8(3): 9p.

- [7] Fekumo, B., Omeka, F.O. (2022): Influence of students' perception on mathematics on junior secondary school students' academic performance in yala local government area of cross river state, nigeria. – *An International/Multidisciplinary Journal of Network for Grassroots Science and Mathematics Education (The VillageMath Network)* 3(1): 53-71.
- [8] Idris, R., Bacotang, J., Govindasamy, P., Nachiappan, S. (2023a): Empowering minds: Harnessing the potential of cognitive field independence and dependence in STEM education. – *International Journal of Academic Research in Business and Social Sciences* 13(9): 1504-1514.
- [9] Idris, R., Govindasamy, P., Nachiappan, S. (2023b): Challenge and obstacles of STEM education in Malaysia. – *International Journal of Academic Research in Business and Social Sciences* 13(4): 820-828.
- [10] Idris, R., Govindasamy, P., Nachiappan, S., Bacotang, J. (2023c): Revolutionizing STEM education: Unleashing the potential of STEM interest careers in Malaysia. – *International Journal of Academic Research in Business and Social Sciences* 13(7): 1741-1752.
- [11] Ji, Y., Park, J. (2024): Early childhood teacher's perception of good early childhood mathematics education using metaphor analysis. – *Korean Association for Learner-Centered Curriculum and Instruction* 24(23): 1-18.
- [12] Jo, S., Son, J.W. (2022): 'I can create and eat it for a snack': how can cooking activities support early math learning? – *Early Childhood Education Journal* 50(6): 983-997.
- [13] Khasanah, I., Purnamasari, I. (2023): Role-playing methods: efforts to stimulate the development of early childhood numeracy literacy. – *Journal of Social Research* 2(4): 1074-1078.
- [14] Khowaja, H.A., Kang, M.A. (2021): A study of parents' perceptions about early childhood education and development in the Pakistani context. – *Journal of Early Childhood Care and Education (JECCE)* 5(2): 63-76.
- [15] Kim, J.J., Kim, E.J. (2025): Pre-service early childhood teachers learning about early childhood mathematics education as reflected in participant observation journals. – *Korean Association for Learner-Centered Curriculum and Instruction* 25(3): 513-529.
- [16] Konca, A.S., İlhan, S.D. (2021): Learning activities in preschool classrooms: preferences of preschool teachers and views of parents. – *Participatory Educational Research* 8(4): 186-197.
- [17] Maisarah, M.A., Syaza, H.Z. (2021): Persepsi ibu bapa terhadap kaedah bermain dalam pembelajaran matematik awal kanak-kanak di rumah: Parent's perception on playing method in early childhood mathematics at home. – *Jurnal Pendidikan Awal Kanak-Kanak Kebangsaan* 10(2): 1-15.
- [18] Masyetah, M.A.B.S., Syaza, H.S. (2021): Persepsi ibu bapa terhadap aktiviti belajar melalui bermain bagi kanak-kanak prasekolah. – *Jurnal Pendidikan Awal Kanak-Kanak Kebangsaan* 10(2): 35-46.
- [19] Naldo, J., Mohamad, I.M.I., Yusni, Y., Pamella, B., Rizah, S., Grace, W. (2023): Belajar sambil bermain di dalam kelas pada peringkat pendidikan awal kanak-kanak. – *Malaysian Journal of Social Sciences and Humanities (MJSSH)* 8(4): 15p.
- [20] Ng, D., Fisher, J., Au, M., Lo, S. (2020): Parental perceptions of holistic early childhood education in Hong Kong. – *Educational Planning* 27(1): 49-60.
- [21] Ngien, H.W., Murugan, R., Nor, A.S@S. (2021): Analisis literatur bersistematis terhadap hubungan antara keterlibatan ibu bapa dengan prestasi akademik. – *Jurnal Dunia Pendidikan* 3(4): 344-363.
- [22] Nor, H.R., Siti, N.M.Y., Nurhafizah, M.S. (2021): Terapi bermain menurut pendekatan Islam: Play therapy in Islamic approaches. – *Jurnal Pendidikan Awal Kanak-kanak Kebangsaan* 10(2): 61-70.
- [23] Noraina, N., Connie, S., Jusiah, I., Nur, S. S. (2024): Keberkesanan pembelajaran berasaskan alam semula jadi terhadap pencapaian matematik awal kanak-kanak prasekolah. – *Malaysian Journal of Social Sciences and Humanities (MJSSH)* 9(10): 14p.

- [24] Norwaheda, H., Siti, M.B.M. (2022): Kebimbangan dan kepercayaan matematik serta hubungan dengan pembelajaran matematik. – *Malaysian Journal of Social Sciences and Humanities (MJSSH)* 7(4): 15p.
- [25] Nur, A.N.B., Norly, J. (2023): Analisis keperluan pembangunan Math Addition Bag untuk meningkatkan kemahiran operasi tambah dua digit kanak-kanak prasekolah. – *Jurnal Pendidikan Awal Kanak-kanak Kebangsaan* 12(2): 114-127.
- [26] Nurdiyana, T., Ahmad, M.M.H., Nur, H.A.W. (2021): Permainan interaktif membantu pembelajaran matematik awal kanak-kanak empat tahun. – *Jurnal Kesidang* 6(1): 62-68.
- [27] Peixoto, F., Mata, L., Campos, M., Caetano, T., Radišić, J., Niemivirta, M. (2024): ‘Am I to blame because my child is not motivated to do math?’: Relationships between parents’ attitudes, beliefs and practices towards mathematics and students’ mathematics motivation and achievement. – *European Journal of Psychology of Education* 39(2): 1561-1586.
- [28] Radišić, J., Baucal, A. (2024): Mathematics motivation in primary education: building blocks that matter. – *European Journal of Psychology of Education* 39(2): 1505-1512.
- [29] Rahimah, W. (2020): Keberkesanan pembelajaran berasaskan permainan dalam kalangan pelajar institusi pengajian tinggi. – *Journal of Education and Social Sciences* 16(1): 9-13.
- [30] Rutkiene, A., Narusaitiene, G. (2024): Attitudes of parents and teachers towards mathematics education in the context of STEAM education. – *Proceedings of the International Scientific Conference* 2: 48-58.
- [31] Sedek, M.M.A.B., Zaini, S.H. (2021): Persepsi ibu bapa terhadap aktiviti belajar melalui bermain bagi kanak-kanak prasekolah: Parents’ perceptions of learning activities through play for preschool children. – *Jurnal Pendidikan Awal Kanak-kanak Kebangsaan* 10(2): 35-46.
- [32] Shone, E.T., Weldemeskel, F.M., Worku, B.N. (2024): The role of students’ mathematics perception and self-efficacy toward their mathematics achievement. – *Psychology in the Schools* 61(1): 103-122.
- [33] Tan, X.X., Norly, N. (2024): Tahap pengetahuan guru prasekolah melaksanakan pendekatan belajar melalui bermain dalam pembelajaran matematik awal. – *Jurnal Pendidikan Awal Kanak-kanak Kebangsaan* 13(1): 66-79.