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Parental Scaffolding and Problem-Solving Skills in Early Childhood: A Systematic Literature Review

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ABSTRACT
Parental scaffolding in socio-cultural contexts was found to promote the development of children's problem-solving skills. However, there's been a lack of systematic reviews exploring how parental scaffolding influences problem-solving skills among children during their early years. The current article seeks to examine the existing research on the influence of parental scaffolding on problem-solving skills in early childhood. Following the PRISMA Statement (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) review method, a systematic review of the Scopus and Google Scholar databases identified five relevant studies. A comprehensive analysis of these articles resulted in the identification of two primary themes-verbal instructions and contingent scaffolding. The reviewed studies revealed that early childhood problem-solving skills are much improved when parents use verbal explanations. It seems that employing verbal instructions offers a multimodal approach that is effective for young children, facilitating a better grasp and applying problem-solving techniques. Understanding the influence of parental scaffolding on early childhood problem-solving skills has implications for parenting education programs, early childhood interventions, and the design of family-oriented interventions aimed at optimizing cognitive development during this critical developmental stage.

Keywords: early childhood, problem-solving skills, scaffolding, systematic review, zone of proximal development

I. INTRODUCTION

In the twenty-first century, children's problem-solving skills are crucial, as they are key to developing crucial life skills. Problem-solving skills have been defined as a person's core capacity to confront and handle difficulties using critical, logical, and systematic thinking [1]. Developing strong problem-solving skills can assist children to reach their fullest potential and foster their cognitive advancement. According to [2], a problem occurs when a goal or target state must be realized in any given situation, and no predictable or consistent solution is available. In other words, a problem refers to a situation where a person is unsure of how to efficiently reach a desired destination or complete a task within a given timeframe. Children who are competent at problem-solving can build strong friendships, and see situations from the perspective of others.

However, children with insufficient problem-solving skills may struggle to achieve their full potential throughout life [3]. Thus, children should learn this skill early in life, particularly during their formative years, to better prepare themselves for overcoming both present and future challenges. The acquisition of problem-solving skills during early childhood is vital, as it empowers children to cultivate logical, critical, and systematic thinking skills [4].

Problem-solving skills can be acquired at an early age and nurtured in an appropriate setting [5]. Previous studies have shown that children who excel in this skill are more creative in solving issues, better equipped to meet new challenges, more skilled in managing emotion, more likely to achieve success, and acquired sophisticated competencies that align with their maturation [6]. Scaffolding allows children to develop independent problem-solving abilities [7]. Scaffolding was first developed by [8] to demonstrate the support and guidance offered by more competent individuals or adults (such as parents, teachers, or peers) in helping children complete a task on their own. Based on [9] children can achieve high levels of cognitive development by using the scaffolding techniques. Scaffolding aims to offer temporary support and guidance initially at a low level, with the level of assistance gradually decreasing according to the children's problem-solving proficiency [10], [11]. According to [12], scaffolding is a style of instruction in which an instructor assists a learner in reducing the complexity of a task, allowing the learner to accomplish it. Reducing complexity enhances learning by facilitating the more efficient allocation of cognitive resources like working memory capacity [12].

The concept of scaffolding is associated with Vygotsky's work, especially on the zone of proximal development (ZPD) [13], [7]. ZPD has been defined as a gap between a learner's actual developmental level, which is determined by their ability to overcome problems independently, and their potential developmental level, which is assessed by their capacity to solve problems with assistance from adults or cooperation with more skilled peers [7]. Scaffolding has been embraced as a general instructional method designed to provide access to the ZPD. It involves three important components: contingency, fading, and transfer of responsibility [14].

The first component is contingency which signifies that the guidance and assistance from the expert should be flexible and adapt to the learner's specific needs and feedback. It's a significant indicator of how well the support is received [15]. Contingency in scaffolding ensures that children are never left alone when they struggle to complete a task [16]. The second component, fading, involves slowly reducing the help provided as the learner's abilities improve and they become more capable of performing a task independently. [17] posits that fading aims to improve children's abilities by shifting their responsibility for task completion from the adults to the children themselves. Finally, the transfer of responsibility takes place when the learner has effectively mastered the task. This means that parents will progressively shift the responsibility from themselves to their children as they become more self-reliant [18].

The Sociocultural Theory [7] states that social interaction, initially occurring between individuals (interpersonal) is beneficial to children's cognitive development before it is internalized within the individual (intrapersonal). Interactions with others mainly support the internalization process. According to [19], children begin to internalize information when they reflect on what they have learned through interactions with others. They assimilate the ideas and concepts they have acquired and integrate them into their thinking, using them to address new situations.

This systematic literature review (SLR) comprehensively analyses the existing body of work and highlights any gaps that require attention [20]. Furthermore, this SLR seeks to deepen understanding of key issues necessary for critical analysis, reflection, and recommendation [21]. It aims to explore the literature on parental scaffolding and problem-solving skills, by focusing on the early childhood stage. The study is driven by the research question, "How does parental scaffolding influence problem-solving skills in early childhood?".

II. METHOD

This section begins with an in-depth discussion of the methodological framework applied, namely the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). It then outlines the development of research questions, the systematic search approach (including identification, screening, and eligibility criteria), and the data extraction and analysis processes.

A. Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA)

This systematic review adheres to the PRISMA publication standard, which directs researchers in framing research queries conducive to systematic investigation, establishing inclusion and exclusion criteria, and scrutinizing an extensive scientific literature database within a specified timeframe [22]. In this context, PRISMA provided the framework for the researchers to conduct a comprehensive search for terms associated with parental scaffolding and its influence on problem-solving skills in early childhood reviews.

B. Development of Research Questions

The study must first establish a clearly defined research question to guide the process of systematic review.

Given that the primary goal of the present study was to thoroughly analyze the existing literature on parental scaffolding and problem-solving skills in early childhood, the research issue addressed was: what scaffolding techniques have been used by parents to increase their children's problem-solving skills during the early childhood stage?

C. Systematic Searching Strategy

The search strategy was categorized into three major processes: identification, screening, and eligibility assessment.

i. Identification

The process of identification is employed to enhance the primary keywords, a crucial step that significantly increases the likelihood of accessing additional articles pertinent to the review [22]. The researchers sought similar terms and synonyms for the main keywords to widen the range of keywords—parental scaffolding, problem-solving skills, and early childhood—by utilizing an online thesaurus, reviewing keywords from previous research, considering suggestions from databases, and consulting experts. The reduced keywords were integrated with search techniques involving Boolean functions, term searching, truncation, field codes, and wildcards, as outlined in Table 1. The search process used two selected database systems: Scopus and Google Scholar. The review relied on Scopus as its primary database, a leading source renowned for its extensive coverage of peer-reviewed articles. It features upwards of 22,800 journals from 5,000 publishers worldwide. The second database employed is Google Scholar, a widely utilized web-based academic search engine that indexes a broad range of records, varying from 2 to 100 million, encompassing both academic and grey literature, which encompasses works not officially published by commercial academic publishers. The search process has been conducted in August 2023. An extensive search string was formulated to find relevant articles in both Scopus and Google Scholar databases. (see Table I). The researchers used similar keywords used in Scopus to search relevant articles in Google Scholar. Various search techniques were employed, including field code functions, Boolean operators, and phrase searching, either in combination or separately, to enhance the effectiveness of their search. Additionally, the researchers manually reviewed and selected relevant articles from Scopus and Google Scholar. There were 263 relevant articles discovered, but after excluding four duplicates, only 259 were included in the study.

"**Table I:** The Search String Used for the Systematic Review Process"

Databases	Keywords Used
Scopus	"parent* scaffolding" OR "maternal scaffolding" OR "paternal scaffolding" AND "problem-solving skills" OR "problem-solving ability" AND "early childhood" OR "child*" OR "early years" OR "preschool children" OR "preschoolers"
Google Scholar	"parental scaffolding" OR "maternal scaffolding" OR "paternal scaffolding" AND "problem-solving skills" OR "problem-solving ability" AND "early childhood" OR "children" OR "early years" OR "preschool children" OR "preschoolers"

ii. Screening

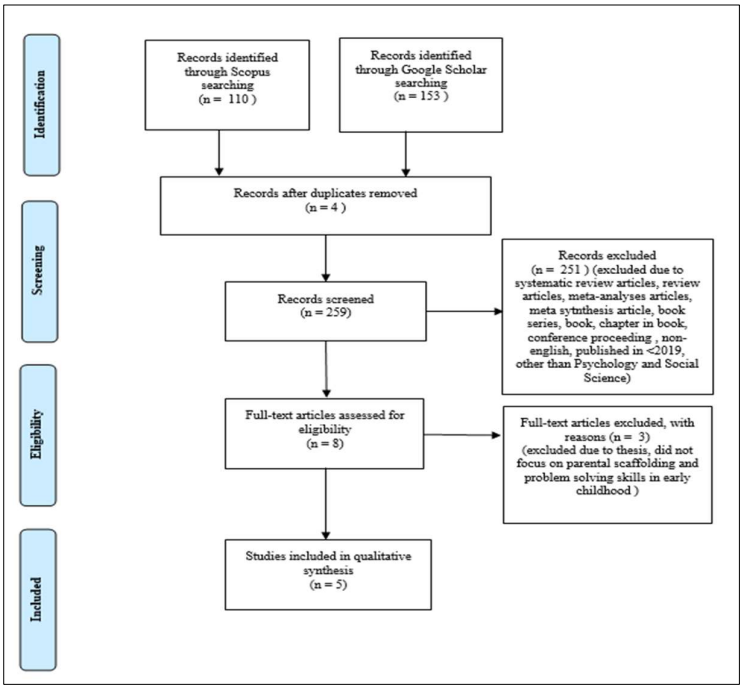
The eight publications that were chosen during the identification process were then screened by the researchers. The criteria used for screening included the type of literature, language, and the year of publication (Table II). Journal articles were chosen as the main source for this review because they provide the primary data needed for a thorough systematic review. The authors preferred articles in English to ensure a clearer understanding of the content. To capture the research's evolution regarding this topic, the review followed the notion of study maturity, which highlights the importance of having a substantial number of articles for a comprehensive review [23], [24]. As a result, the study focused on articles published over the past five years (2019 to 2023), as this timeframe offered a robust selection of relevant literature.

"**Table II:** The Inclusion and Exclusion Criteria"

Criterion	Eligibility	Exclusion
Literature type	Indexed Journal (research articles)	Non-indexed journals, Systematic review journals, chapters in a book, conference proceedings, thesis
Language	English	Non-English
Timeline	Between 2019-2023	< 2019

iii. Eligibility

Eligibility is an important criterion to determine which articles should be included or excluded in the systematic review. In this last stage, five articles were selected for qualitative analysis (see Figure 1).



"**Figure I:** "Flowchart of selected article selection through PRISMA framework"

iv. Data Extraction and Analysis

After thoroughly evaluating the remaining articles, particular focus was given to those that specifically addressed the research questions. The researchers began by reviewing the abstracts and then conducted a detailed analysis of the full articles to identify relevant themes. The data were synthesized using thematic analysis to explore themes related to parental scaffolding and problem-solving skills in early childhood. Thematic analysis, according to [25], is a technique for uncovering and exploring themes in the data. It involves identifying, organizing, and describing these themes to provide a clear and meaningful understanding of the patterns and insights found in the information. This approach holds several advantages for researchers. Notably, it delves into diverse perspectives, uncovering both similarities and differences and fostering the emergence of unexpected insights. Furthermore, the technique aids in summarising extensive datasets, enabling researchers to manage data in an ordered and systematic manner and resulting in understandable findings, as emphasized by [26]. Crucially, thematic analysis aligns seamlessly with the current review's focus on mixed research designs, as highlighted by [27]. In the generation of themes, patterns were identified from the collected data. with researchers developing themes by identifying any commonalities or connections within the information gathered.

III. RESULTS

The review identified four primary themes related to parental scaffolding and problem-solving skills in early childhood. The two primary themes, as highlighted earlier were verbal instructions and contingent scaffolding. The findings can be seen in Table III. The findings provide a comprehensive analysis of parental scaffolding and problem-solving skills in early childhood.

"**Table III:** Table of Findings"

Title of the Article, Authors	Children's Age Range	Scaffolding Strategies
The effect of maternal scaffolding on problem solving skills during early childhood [28]	48 to 83 months	Children who were given verbal instructions by their caregivers demonstrated greater success in solving problem-solving tasks.
How parental instructions scaffold young children's learning performance: A cross-cultural comparison between America and China [30]	3-4 years old	The commanding instructions given by parents were notably effective in predicting the children's outcomes in independent learning.
Examining parent–child spatial play interaction using traditional toys and touch screen	37-67 months	Parents consistently provided diverse positive support to children in different play settings by employing

tablets [31]		a primarily child-centered approach in their interactions.
What parents bring to preschool children? Parental instructive speech and gestures, children's learning and cultural differences [29]	3-4 years old	Parents' verbal instructions proved to be more effective in enhancing children's learning outcomes during a challenging puzzle game.
The use of scaffolding technique to improve children's problem-solving skills [32]	46-86 years old	Contingent support has increased the levels of children's problem-solving skills.

A. Verbal Instructions

Verbal instruction scaffolding within the realm of developing children's problem-solving skills refers to the use of spoken language to provide direction, support, and structure during learning tasks. This instructive technique helps children develop problem-solving skills by providing explicit explanations, prompts, and step-by-step guidance. Among the research chosen, four discovered that verbal instructions affect children's problem-solving skills [28], [29] [30] and [31]. The study conducted by [28] involved mothers and preschool children (ages between 48 to 83 months). The children were assigned the task of completing a 48-piece jigsaw puzzle. The findings showed that children who were given verbal instruction from their parents performed better in problem-solving tasks.

Another study conducted by [30] demonstrated that parental directive instructions greatly enhanced children's ability to learn independently. During the problem-solving process, parents typically provide more direct knowledge and information. Meanwhile, [29] found that children benefited more from parents' speech instructions during problem-solving tasks. Moreover, [31] found that parents used a child-directed interactional style to actively scaffold children in both play situations with a variety of positive supports. Parents encourage children to take charge of the lesson in several ways, such as by having them create goals, make decisions, and find solutions to problems [31]. Parents might provide direct guidance to their children or use prompts and questions.

B. Contingent Support

The term "contingent" suggests that assistance depends on the learner's comprehension, actions, and answers. To put it another way, parents modify their scaffolding according to each child's unique requirements and reactions. A study conducted by [32] found that contingent support had increased the levels of children's problem-solving skills. The mothers in the study used a range of support from Level 1 (verbal) to Level 5 (demonstration). The levels of support can be increased or decreased based on children's needs.

IV. DISCUSSION

The primary goal of the current study was to systematically review the existing research on parental scaffolding and problem-solving skills in early childhood. A systematic review of the literature was carried out using two databases, which yielded five articles that specifically address scaffolding techniques used by parents. The review yielded two themes, namely verbal instructions, and contingent scaffolding.

According to the analysis, it appears that employing verbal instructions offers a multimodal approach that is effective for young children, facilitating a better grasp and applying techniques for resolving problems. In the context of verbal guidance, scaffolding involves offering precisely the right amount of guidance to assist children in problem-solving, fostering the development of their cognitive skills. Verbal instruction scaffolding enables parents to adjust their support to each child's specific needs. They may adjust their language, degree of detail, and pace to accommodate children's various learning styles and skills. Besides that, it involves providing children with encouraging verbal cues, directions, and suggestions to help them explore and solve problems. This type of scaffolding technique aligns with Vygotsky's sociocultural theory, which emphasizes that children's cognitive development is profoundly influenced by social interactions and the use of language [7].

Social interaction may promote children's cognitive development, starting with the interpersonal level and then becoming internalized within the individual. According to [7] social interaction is the essential foundation for the internalization process. These interactions help the children internalize new information and methods [33]. Children begin to internalize the information, ideas, and concepts when they reflect on what they have learned via social interactions.

For the second theme, the authors found that contingent scaffolding will increase problem-solving skills in early childhood. Contingent scaffolding, as proposed by [14] is a sort of supportive communication provided by adults (parents) to children when engaging in problem-solving tasks. The adult's dynamic and contingent response to the child's cues, behaviors, and verbalizations distinguishes this technique. The term contingency is

also known as "the shift rule" [34]. It describes a shift in how parents scaffold based on their child succeeds: more detailed instructions are given with less cognitive demands, and less detailed instructions are given with higher cognitive demands [35]. In the realm of children's problem-solving skills, contingent scaffolding becomes an effective tool for promoting cognitive development. This responsiveness contributes to a dynamic and interactive learning environment in which the parents modify their support and guidance based on child's needs, actions, and comprehension level.

However, this systematic literature review focuses solely on parental scaffolding within children in early childhood contexts. Future research could examine the parental scaffolding in the middle childhood stage. Furthermore, examining the differences in parental scaffolding practices across different countries could reveal how cultural differences shape the ways parents support their children. This systematic literature review also highlights the necessity for more empirical studies to explore the effects of parental scaffolding on problem-solving skills during early childhood. The findings imply that there is a need to incorporate these insights into parenting education programs, early childhood interventions, and the design of family-oriented interventions aimed at optimizing problem-solving skills during this critical developmental stage. The findings from this study imply that parents who connect and engage with their children during play may help them develop their problem-solving abilities. Children may benefit from parental scaffolding, especially during playtime. These results point to strategies for instructing parents on how to adjust their scaffolding following the needs and skills of their children. With sufficient parental guidance and support, children get better at handling the tasks given to them. Through scaffolding, children can progressively learn the abilities and proficiencies required to solve problems independently. In conclusion, parents play an important role in providing appropriate scaffolding techniques. They can help children solve problems independently in a variety of situations in the future.

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V. AUTHORS PROFILE

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Rumaya Juhari, is a Professor of Human Development and Family and Child Ecology at the Department of Human Development and Family Studies, Faculty of Human Ecology, Universiti Putra Malaysia. She obtained her Ph. D. (Family & Child Ecology, 1997) and MA (Family Studies, 1993) from Michigan State University, East Lansing, USA. Rumaya has nurtured her professional endeavour in family studies and human development, specializing in marriage and parenting, and child behavioural outcomes. She has been lecturing on Human Development, the Ecology of Marriage and Parenting, Family Theory, Research Methodology, and Stress and Coping. Rumaya has been involved in research on marital relationships, mixed marriages, divorced families, fathering, and parenting across the life cycle and various ecological contexts. Currently, she leads her team working on international-linked research putting parenting coaching into a new frontier, namely e-Positive Parenting Naungan Kasih Research and Intervention (online) to meet the challenges that come with the COVID-19 pandemic. She also leads a consultation project on Family Impact Assessment for the Ministry of Women, Family, and Community Development. Rumaya has published journal articles, books, chapters in books, proceeding papers, training modules, and popular writing. She was an invited author-contributor for the Encyclopedia of Family Studies on Malaysian Family; and co-authored a chapter on fathering in an internationally published book. In 2019, Rumaya and her research team earned a copyright for the Marital Health Scale that they developed based on their FRGS project. Rumaya has served as a Consultant, Expert Panel, and Speaker at various agencies for program development, research programs, and activities. She was involved in the development of three training modules on Fathering, Parenting@Work, and Grandparenting for LPPKN. She was also a board member of the National Children's Advisory & Consultative Council. Rumaya is often consulted by local print and electronic media for issues about marriage, family, and parenting. She is also active in community outreach programs involving children and their families.

Zainal Madon is a registered counsellor with the Malaysian Board of Counsellors and has served as a counsellor, lecturer, and researcher for the last 23 years. He is currently an Associate Professor at the Department of Human Development and Family Studies, Faculty of Human Ecology, Universiti Putra Malaysia. He led 25 research projects concentrating on various themes which include child and adolescent development, parenting, at-risk children, impact studies on

intervention/training, and at-risk families. Zainal is actively involved in international partnering research projects with researchers from Leiden University, Netherlands (adolescent aggression), Bournemouth University, UK (childcare), Meastral and UNICEF Malaysia (reviewing Malaysia parenting module), and the University of New Mexico, the United State of America (migrant father). Zainal was also involved in several policy studies under the Ministry of Women, Family, and Community Development that focus on issues related to homeless people and the de-institutionalization of children, the Ministry of Education on developing curriculum and training modules for Early Childhood Program, and the Ministry of Rural Development for reviewing and developing a strategic plan for preschool among rural children. Now, he is a lead consultant for training childcare teachers under the PERMATA program, a national program for childcare and early childhood education.

Zarinah Arshat is a Lecturer and Researcher at the Department of Human Development and Family Studies, Faculty of Human Ecology, Universiti Putra Malaysia. Her road interest is concerned with family and child development. She leads research that focuses on the strengths and stressors that may be available in a variety of types of a family such as strong families, commuter families, and low-income families. She also analyzed how these strengths and stressors may influence the development of each family member, especially children. She has developed a Malaysian Family Strengths Scale with her colleagues in the Department of Human Development and Family Studies. Zarinah has also been involved in the Malaysian Positive Parenting Naungan Kasih project. She has published several articles related to family and child outcomes.

Mohd Najmi Daud obtained his First and Master's degrees in Clinical Psychology from the International Islamic University of Malaysia (IIUM) before pursuing a Ph.D. in Psychology at Massey University, New Zealand. His expertise is in the field of Psychopathology and qualitative research in psychology. He had experience working as a psychological consultant at a multinational consulting firm before turning his career into academia. He has taught at several public and private institutes of higher learning in Malaysia, including the University of Malaya (UM), the International Islamic University of Malaysia (IIUM), the University of Selangor (UNISEL), and the Xiamen University Malaysia (XMU). He is currently a Senior Lecturer in the Department of Human Development and Family Studies, Faculty of Human Ecology, Universiti Putra Malaysia (UPM). Throughout his service in the academic line, he has been teaching various psychology subjects at the bachelor's level, including Psychopathology, Cognitive Psychology, Social Psychology, Medical Psychology, and several other psychology subjects. Apart from that, he is also a supervisor to many Master's and Ph.D. students at UPM. In the field of research, he actively conducts research related to adolescents, especially those involving mental and behavioural disorders. The results of his research have been presented in conferences at local and international workshops and conferences, including in Thailand, Indonesia, Sri Lanka, New Zealand, and others. He is also involved in the publication of scholarly articles. Among his works that have been published are related to the problem of conduct disorders among Malaysian adolescents, schooling experiences among adolescents with conduct issues, and aggression among adolescents, to name a few. In addition, he is also active in consulting projects on psychological issues with various government and private agencies as well as knowledge transfer programs with the community. Meanwhile, he is the chairman of the professional services bureau of the International Association of Behavioral Sciences, a member of the Malaysian Psychological Association (PSIMA), a member of the International Society for the Study of Behavioral Development (ISSBD), and a member of the International Association for Cross-Cultural Psychology (IACCP).

Naqi Dahamat Azam graduated in the field of Developmental Psychology from Leiden University, the Netherlands, and has served as a Senior Lecturer at the Faculty of Human Ecology UPM since 2019. As a lecturer, he was assigned to teach the Psychology of Child and Adolescent Development, and also Motivation and Human Achievement. Thus far, he has experience in conducting various research activities. For instance, his Ph.D. study focused on the relationship between adolescent emotions and aggressive behaviour. Apart from that, he has also been involved as a co-researcher in research projects involving organizations such as the National Anti-Drug Agency (AADK) and the Ministry of Higher Education. He also plays an active role as a supervisor of final year project theses, and also as a co-supervisor for Master's and Ph.D. students. At the same time, he has been actively involved in presenting research papers at seminars and conferences. He has presented papers at various national and international conferences (such as the Netherlands and Austria) and was also invited to chair presentation sessions. His publications can be found in various social science journals including an ISI journal and non-cited journals. He also contributed chapter writing for several locally published books. In addition, he was also invited to evaluate manuscripts for publication in journals internationally. He is currently involved in a consultation project with the Inland Revenue Board of Malaysia. He was also involved in student development programs,

e.g., supervisor for internship students. He also acts as a member of community networking projects. Recently, he was assigned as the leader of a sub-project for the Millennial Generation Program at Sekolah Menengah Agama Pekan Gurun, Kedah.