Journal for Re Attach Therapy and Developmental Diversities
eISSN: 2589-7799
2023 July; 6 (7s): 476-486

# The Use of Scaffolding Technique to Improve Children's Problem-Solving Skills

**Nellie Ismail, Rumaya Juhari, Zainal Madon, Zarinah Arshat, Mohd Najmi Daud, Muhammad Naqiuddin Dahamat Azam**
Universiti Putra Malaysia

Received: 16-May-2023
Revised: 11-June-2023
Accepted:02-July-2023

**Abstract—**In order to better understand how the scaffolding method affects toddlers' problem-solving abilities, this study looked into its consequences. With a nonrandomized controlled trial, this study used a quasi-experimental approach. 46 moms and 86 preschoolers from Universiti Putra Malaysia's two preschools, all of whom were between the ages of five and six, took part in the study. The participants were split into experimental and control groups at random. Five levels of support were used as the foundation for the scaffolding approaches: "level 1, general verbal therapy; level 2, specific verbal treatment; level 3, specific verbal treatment combined with non-verbal indicators; level 4, preparation for the next action; and level 5, demonstration. Participants were tested on their ability to solve puzzles using a 35-piece set". Three stages of data collection were used: "(1) a pre-test, (2) the application of a scaffolding treatment, and (3) the gathering of post-test data". The data were analysed using the independent sample t-test and the paired sample t-test. According to the results, there were statistically significant variations between the experimental group and the control group's post-test mean scores. Additionally, the results revealed a sizable difference between the pre-test and post-test. These results suggest that during therapy, children might internalise their mothers' scaffolding strategy and become better able to accomplish the activity on their own. In order to help their children improve their problem-solving abilities, parents must therefore provide the right kind of support based on the children's abilities.

**Index Terms—**children, preschoolers, problem-solving skills, scaffolding, zone of proximal development

## I. INTRODUCTION

Problem-solving is one of the fundamental skills embodied in 21st-century skills. It has been defined as the ability to recognize, identify, and deal with difficulties [1]. Problem-solving is a multifaceted process comprising cognitive, emotional, and psychomotor activity. Children will develop their cognitive processing abilities as they "learn to think critically, creatively, and reflectively to identify solutions when faced with problems" [2], [3]. Problem-solving skills are vital cognitive skills that children use to organize and carry out various developmental and social tasks. It is also one of the important basic skills children can use throughout life [4]. A child's problem-solving ability will help them develop their logical, critical, and systematic thinking capacity. Hence, they must possess this skill in their early years [5]. Mastering problem-solving skills can help children reach their full potential in the future while enhancing their cognitive development. According to previous research, children who can master this skill will be better able to solve problems creatively [6], be more prepared to face new challenges, be better at regulating their emotions, highly successful, and develop complex skills in line with their maturity [7].

In addition, children that are good at solving problems can form strong friendships, comprehend the feelings of those around them, and view situations from the perspectives of others. Therefore, children need to acquire this skill as early as possible, especially in the early years of life, to equip themselves better to deal with current and future obstacles. This skill can be learned at a young age and developed in a suitable environment [8]. Nevertheless, a study conducted by [9] revealed that most Malaysian preschoolers have moderate cognitive abilities. Moreover, The "Programme for International Student Assessment (PISA)" results showed that Malaysian children lagged in problem-solving and critical thinking skills [10], [11]. This issue must be treated seriously because children's cognitive development and problem-solving abilities are strongly related. Prior research also demonstrated that children with low problem-solving skills might have difficulty reaching their full potential in life [12].

The ability to solve difficult and complex problems for children in the early childhood stage remains limited as children's cognitive development is at a preoperational level at this age, which prevents them from thinking logically [13]. Therefore, preschool children require guidance and support from their parents. Children can acquire independent problem-solving abilities through scaffolding [14]. The term "scaffolding" was initially used by Wood and colleagues in 1976 to describe the assistance and support given by knowledgeable others (parents, teachers, or peers) who is more knowledgeable or more skilled than the kids in relation to a particular task, method, or concept. These individuals can aid the learning process by employing scaffolding techniques as they assist children in completing new and difficult tasks. Scaffolding helps children develop the abilities they need to solve problems on their own in the future while simultaneously offering them temporary support [15].

Additionally, parents must assist children's learning until they are capable of moving on to the next level on their own [16]. According to the Sociocultural Theory [14], children's cognitive development is aided by social interaction, which initially takes place on an interpersonal level before becoming internalized on an intrapersonal level. Internalization is the process through which an individual move from a societal to an individual level [14]. Social interaction serves as the primary foundation for the internalization process [14]. The children will internalize the new information and methods through these interactions [17]. Children start internalizing concepts when they begin to think about the knowledge, they have gained by interacting with others. They will internalize the knowledge and concepts they have learned and incorporate them into part of their thinking to use when confronted with new circumstances.

Previous researchers have suggested that scaffolding can aid individuals or children in performing desired behavior or skill [18]. In the scaffolding process, the parent offers assistance for the components that are initially beyond the child's capacity and adjusts their response contingently based on the child's needs [15]. Parents will gradually "transfer responsibility" from themselves to their children as they become independent [19]. Previous researchers stated that effective scaffolding techniques used by adults might help children grasp necessary abilities and further foster their initiative in problem-solving behaviors [14], [20]-[23].

Numerous studies have looked into how maternal scaffolding affects kids' capacity for problem-solving. For instance, earlier researchers looked at the relationship between mothers' scaffolding and preschoolers' task performance [24]. A total of 132 preschoolers took part in the study. The scaffolding of mothers was evaluated on two levels: the manner in which it occurs (the means used), and the behaviours that are scaffolded (the purposes behind the scaffolding: cognitive support, metacognitive support, and autonomy support). The subtest "triangles" from “Kaufmann's Assessment Battery for Children II's German edition” were used to create the problem-solving problems. The results showed a substantial beneficial association between mother-child task performance and maternal autonomy support. As a result, the findings suggest that greater levels of autonomy support are associated with greater performance levels.

The aforementioned result is in line with [25]. They looked at the connections between a child's self-regulated learning and the parental scaffolding characteristics. Various problem-solving tasks were completed by 130 Chinese kindergarten students, both individually and with their parents. The effectiveness of parental scaffolding was evaluated using two parent-child problem-solving activities, which are matching puzzle pieces and folding origami paper. The findings demonstrated that parental contingency influenced children's metacognitive strategic behaviors, which, in turn, predicted task performance.

“Nevertheless, this finding contradicts [26], who investigated the impact of parental scaffolding on children's problem-solving skills. Children aged six to seven years old and their mothers participated in the study. The participants were split into two groups (control group and experimental group). Two tasks were used to assess problem-solving skills: arranging pictures and building a 32-piece LEGO model of a frog. Mothers' scaffolding was rated based on three dimensions of scaffolding (directiveness, cognitive support, and praise and criticism). The results showed no significant difference in problem-solving skills between both groups in the pre-test and post-test”.

A prior study revealed that mothers who applied scaffolding in a directive manner and gave their children less responsibility decreased the degree of the children's involvement [27]. It constrained their opportunities to explore an activity. On the other hand, too little assistance may reduce children's ability to complete tasks independently and experience repeated failures [32]. This issue clearly shows that although parents are always

ready to promote their children's development, they are unsure of the most effective ways to assist their children. Hence, parents must thoroughly understand children's zone of proximal development to support and assist them in achieving their full potential in problem-solving skills.

Support and guidance should be given depending on the children's degree of ability. Evaluating children's accomplishments in light of the potential developmental implications of assistance from other people is important [14]. Implementing scaffolding techniques that are not based on the children's level of knowledge and ability will have a detrimental effect on their ability to solve problems. The researchers discovered that most research on this topic has largely been undertaken in Western countries. Therefore, this study has been undertaken to extend prior research findings by determining the effects of the scaffolding technique on preschool children's problem-solving skills, particularly in the Malaysian context. Thus, this study attempts to achieve the following objectives. “1) to determine the difference in children's problem-solving skills between the experimental group and the control group in the pre-test; 2) to determine the difference in children's problem-solving skills between the experimental group and the control group in the post-test; 3) to determine the difference in children's problem-solving skills between the experimental group and the control group in the pre-test and post-test”.

## II. METHOD

### A. Research Design

To ascertain the impact of the scaffolding technique on problem-solving abilities in preschoolers, this study used a quasi-experimental design using a non-randomized controlled trial. The individuals were divided into treatment and control groups at random. In the experimental group, the scaffolding technique was applied. The control group, however, received no treatment at all.

### B. Participants

“A total of 86 preschool children aged between four to six years old from two preschools in Universiti Putra Malaysia and 46 mothers participated in the study. The mothers of the 86 children completed both the background questionnaire and permission forms. The participating children ranged from four to six years of age (M = 5.48, SD = 0.54). Of the 86 children studied, there were almost equal numbers of boys (47.7%) and girls (52.3%). The mean age of the mothers was 36.88 years (SD = 4.33). As per their employment status, the mothers indicated that 94.2% were working, while 5.8% were not working”. Most of the respondents in this study were Malay. Each child and mother received a tumbler as a token for their participation.

### C. Maternal Scaffolding

“The scaffolding techniques were based on five levels of support: Level 1 (general verbal therapy), Level 2 (specific verbal treatment), Level 3 (specific verbal treatment and non-verbal signs), Level 4 (prepares for next action), and Level 5 (demonstration)” [15], [35]. Providing general verbal encouragement to the youngster to try (for instance, "Try again" or "Good job!") is considered assistance at Level 1. Level 2 lays out what the child should do next or proposes aspects of a work for the child to continue putting the puzzle together (For instance: "I think the puzzle piece is not right"; "Try to find a puzzle piece in the corner"). The third stage involves giving the kids verbal and nonverbal cues (for instance, "I think the blue puzzle piece is more accurate"). Although there is a larger amount of support at the fourth level, it is nearly identical to that at the third level. The activity has an alternate solution that the kids can use (for instance, "Take the green puzzle piece"). At Level 5, the highest calibre of help is offered. At this stage of the problem-solving process, a mother assumes total control over the following phase. The mother will take a puzzle piece and place it in the proper spot as an example of how to fit the puzzle properly. Depending on the needs of the children, the level of help can be raised or decreased.

### D. Children’s Problem-Solving Task

Problem-solving skills were measured using a set of 35-piece jigsaw puzzles with different themes (ocean and forest). Each child was asked to combine the puzzle pieces by matching a sample picture for each test phase (pre-test and post-test) within 20 minutes. Each puzzle component that was correctly assembled without assistance received a score of 1. By adding the scores for the right task in the right spot on the pre-test and post-test, the score for problem-solving abilities was determined.

E. Procedure

Ethics approval was acquired from "The Ethics Committee for Research Involving Human Subjects at Universiti Putra Malaysia (Jawatankuasa Etika Universiti Penyelidikan Melibatkan Manusia)" prior to data collection. Before collecting data, permission from the principals of the chosen preschools was requested. After receiving consent to ensure their confidentially, each participant received a thorough debriefing about the study. The information was gathered in three stages: the pre-test, the scaffolding treatment, and the post-test. Pre-testing was done as the study's first stage. Before the children received treatment, a pre-test was conducted to ascertain their level of problem-solving ability. A set of 35-piece jigsaw puzzles were given to the kids to do on their own. They have 20 minutes to finish the problem. Using scaffolding strategies, the moms helped the kids in the second part of this study finish a set of 35-piece jigsaw puzzles. The kids weren't given enough time to finish the work during this stage. The post-test is the third stage of this study. After the treatment, the kids were evaluated the next day. Unaided completion of a set of 35-piece jigsaw puzzles was required of the kids. They have 20 minutes to finish the problem. The moms of the children gave their permission for the experiment in this study to be documented.

F. Data Analysis

In order to analyse the data, "IBM SPSS Statistics" 21 was used. The participant's backgrounds were described using descriptive statistics. The difference between the two-group means was examined using an impartial t-test [36]. "Results from the pre-test and post-test for the experimental and control groups in this study were compared. The paired sample t-test was also utilised in the study to analyse the data. By contrasting pre- and post-test findings, the paired sample t-test quantifies each group independently [37]. In other words, the results of the pre-test and post-test are compared using the paired sample t-test to see whether there is a significant difference in each group".

## III. RESULTS

**"Table I: Independent sample t-test for pre-test"**

| | Group | Mean | SD | t | df | p |
|---|---|---|---|---|---|---|
| Post-test | Experimental | 26.93 | 9.15 | 0.91 | 84 | 0.060 |
| | Control | 25.25 | 7.67 | | | |

As shown in Table 1, the independent t-test analysis revealed no significant differences between the mean scores of each group in the pre-test [$t(84) = 0.91$, $p > 0.05$]. These findings showed that both groups demonstrated equal levels of problem-solving skills before the treatment.

**"Table II: Independent sample t-test for post-test"**

| | Group | Mean | SD | t | df | p |
|---|---|---|---|---|---|---|
| Post-test | Experimental | 31.41 | 5.65 | 3.30 | 64 | 0.000 |
| | Control | 26.07 | 8.76 | | | |

Nevertheless, the results in Table 2 demonstrated statistically significant differences [$t(64) = 3.30$, $p < 0.05$] between the mean scores of the experimental group ($M = 31.41$, $SD = 5.65$) and control group ($M = 26.07$, $SD = 8.76$) in the post-test. It shows that the children's problems solving skills in the experimental group were greater than the children in the control group.

**"Table III: Paired sample t-test of the experimental group and control group for pre-test and post-test"**

| Group | | Mean | SD | t | df | p |
|---|---|---|---|---|---|---|
| Experimental | Pre-test | 26.93 | 9.15 | -4.98 | 45 | 0.000 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | Post-test | 31.41 | 5.65 | | | |
| Control | Pre-test | 25.25 | 7.67 | -.58 | 39 | 0.563 |
| | Post-test | 26.07 | 8.76 | | | |

"According to Table 3, the paired sample t-test analysis revealed a significant difference [t (45) = -4.98, $p < 0.05$] in the problem-solving skills of the children in the experimental group between pre-test (M = 26.93, SD = 9.15) and post-test (M = 31.41, SD = 5.65). In contrast, the result was not significant for children in the control group [t (39) = -.584, $p > 0.05$]". This finding suggests that, in general, the children in the experimental group significantly increased their problem-solving skills after the treatment compared to the control group.

## IV. DISCUSSION

Problem-solving is viewed as a vital skill that children can use throughout their life. Therefore, examining the techniques to enhance problem-solving abilities is crucial, and scaffolding is one such technique. The purpose of this study was to ascertain how the scaffolding technique affected children's problem-solving abilities. The results showed that there were no appreciable variations between the pre-test mean scores of each group. It demonstrates that before therapy, the youngsters in both groups had similar levels of problem-solving abilities. However, the post-test revealed substantial variations in the children's problem-solving abilities between the experimental and control groups. These findings showed that the experimental group's children's problem-solving abilities increased following the scaffolding session with their mothers.

The current findings were consistent with the Sociocultural Theory [14], which claimed that learning occurs in the children's zone of proximal development. In this area, the children can solve the difficult task given with the help and guidance from adults and are unable to solve the task on their own. Scaffolding enables children to effectively complete a difficult task within their zone of proximal development. A previous study also found that scaffolding techniques are related to children's task performance [22]. Children's mastery of necessary skills and the development of self-initiated problem-solving behaviors may benefit from the effective scaffolding techniques used by adults [21]. Prior studies stated that the children of parents who used effective scaffolding tended to have better problem-solving skills [38]. Children's cognitive development will rise when parents participate in their play, react to their behavior, set reasonable expectations based on their developmental stages, and support the children's efforts [39].

In contrast, the result was insignificant for children in the control group. This finding demonstrated that children in the experimental group significantly increased their problem-solving skills after the treatment compared to the control group. The above findings align with [40], who found significant effects of parental scaffolding on children's problem-solving abilities. Parental scaffolding works in a transactional way [41]. Parents encourage their children to engage in dyadic activities to ensure they can learn skills beyond their current capabilities [42]. Parental support may facilitate children's independent problem-solving [43]. Children could learn to solve problems and build higher-order thinking skills through the interactive process of scaffolding [14].

Children in the preschool years start to demonstrate greater problem-solving skills, and both parents and children get used to cooperating more [43]. Furthermore, the results also demonstrated that children could internalize the learning process with their mothers during the scaffolding session. Social interaction between mother and child in scaffolding sessions serves as the foundation for internalization [14]. The internalization process is crucial for teaching children how to use the knowledge and abilities they have acquired throughout scaffolding sessions so they can solve problems independently in the future [14], [44].

Several limitations in the current study should be considered to ensure maximum benefit. First, this study only involved preschool children in two preschools at Universiti Putra Malaysia. Therefore, these findings may not be generalizable to all preschool children in Selangor. Hence, future research should investigate the effect of the scaffolding technique on children's problem-solving skills by using diverse samples and different settings. Moreover, the present study only focuses on maternal scaffolding. Therefore, fathers should be included in future research to examine how paternal scaffolding affects children's ability to solve problems. Last but not least, a 35-piece puzzle was used in this study to measure the children's problem-solving abilities. Therefore, it is advised that future research add more puzzle pieces to make the activity difficult for the kids. Despite these

drawbacks, the current study adds to the body of knowledge by advancing our awareness of how scaffolding strategies affect children's problem-solving abilities.

"Practically, the findings of this study have implications for parenting education and training programs that educate parents on how to scaffold their children. The evidence from the present study suggests that mothers may promote children's problem-solving skills by engaging and interacting with them during play. Maternal scaffolding, especially during play sessions, may be beneficial to children. Thus, these findings could indicate ways to teach mothers how to modify their scaffolding based on their children's needs and abilities. In sum, this study contributes to the growing body of literature on the importance of scaffolding techniques in enhancing children's problem-solving skills, especially in the Malaysian context. The children's ability to solve the given task competently improve with the appropriate support and guidance from the mothers. Scaffolding allows the children to gradually acquire the skills and competencies they need to become independent problem solvers".

## REFERENCES

[1] E. Aladag, A. Arıkana, and H. Ozenoglu, "Nature education: Outdoor learning of map literacy skills and reflective thinking skill towards problem-solving," Thinking Skills and Creativity, vol. 40, pp. 1-12, June 2021.

[2] S. Kuldas, S, Hashim, and I. Hairul Nizam, "Malaysian adolescent students' needs for enhancing thinking skills, counteracting risk factors and demonstrating academic resilience," International Journal of Adolescence and Youth, vol. 20, no. 1, pp. 32-47, October 2015.

[3] R. M. Lerner, L. S. Liben, and U. Mueller, Handbook of child psychology and developmental science: Cognitive processes, 7th ed. Hoboken, NJ: Wiley, 2015.

[4] M. Bahar, and P. Aksüt, "Investigation on the effects of activity-based science teaching practices in the acquisition of problem solving skills for 5-6 year old pre-school children." Journal of Turkish Science Education, vol. 17, no. 1, pp. 22-39, March 2020.

[5] E. Syaodih, O. Setiasih, N. F. Romadona, and H. Handayani, "Pengembangan kemampuan pemecahan anak usia dini dalam pembelajaran proyek di taman kanak-kanak," Jurnal Pendidikan Usia Dini, vol. 12, no. 1, pp. 29–36. April 2018.

[6] N. Subadrah, and K. N. Tang, "Exploring parents' and teachers' views of primary pupils' thinking skills and problem solving skills," Creative Education, vol. 3, no, 1, pp. 30-36, Feb. 2012.

[7] L. R. Marotz, and S. Kupzyk, Parenting today's children: A developmental perspective. Boston, MA: Cengage Learning, 2018.

[8] C. T. Sun, L. X. Chen, and H. M. Chu, "Associations among scaffold presentation, reward mechanisms and problem-solving behaviors in game play," Computers and Education, vol. 119, pp. 95-111, April, 2018.

[9] F. D. Hutagalung, and Z. Md Isa, "Cognitive ability among preschool children in Kuala Lumpur Malaysia," in Social Interactions and Networking in Cyber Society , F. L. Gaol and F. D. Hutagalung, Ed. Singapore: Springer, 2017, pp. 15-25.

[10] Organisation for Economic Cooperation and Development (OECD), Student performance (PISA 2018), Malaysia, 2018.

[11] Ministry of Education (MOE), Malaysia Education Blueprint 2013-2025, Malaysia, 2019.

[12] A. Cluver, G. Heyman, and L. J. Carver, "Young children selectively seek help when solving problems," Journal of Experimental Child Psychology, vol. 115, pp. 570–578. Jul 2013.

[13] J. Piaget, Science of education and the psychology of the child. New York: Orion Press, 1970.

[14] L. S. Vygotsky, Mind in society: The development of higher psychological processes. Cambridge, MA: Harvard University Press, 1978.

[15] D. Wood, J. S. Bruner, and G. Ross, "The role of tutoring in problem solving," Journal of Child Psychology and Psychiatry, vol. 17, no. 2, pp. 89–100, April 1976.

[16] S. Neaum, Child development for early years students and practitioners, 4th ed. Exeter: Learning Matters, 2013.

[17] C. Gallucci, "Districtwide instructional reform: Using sociocultural theory to link professional learning to organizational support," American Journal of Education, vol. 1144, pp. 541–581, Aug. 2008.

[18] W. Wiwik, and M. Siti, "Promt scaffolding in learning life skills for self-development of intellectual disabilities students in inclusive primary school," Jurnal Pendidikan Indonesia, vol. 11, no. 1, pp. 71-77. March 2022.
[19] R. Mermelshtime, "Parent-child interactions: A review of the literature on scaffolding," British Journal of Educational Psychology, vol. 87, pp. 241–254, June 2017.
[20] F. Niklas, and W. Schneider, "Casting the die before the die is cast: The importance of the home numeracy environment for preschool children," European Journal of Psychology of Education, vol. 29, no. 3, pp. 327–345. Sept. 2014.
[21] E. V. Korotaeva, and A. V. Svyattseva, "Initiative development in preschool children," Procedia-Social and Behavioral Sciences, vol. 233, pp. 280–286, Oct. 2016.
[22] S. Robson, "Self-regulation and metacognition in young children: Does it matter if adults are present or not?," British Educational Research Journal, vol. 42, no. 2, pp. 185–206. April 2016, Accessed Jan. 16, 2023. doi: 10.1002/berj.3205 [Online]. Available: https://onlinelibrary.wiley.com/doi/abs/10.1002/berj.3205
[23] G. J. Warner, J. N., Lensing, and D. Fay, "Personal initiative: Developmental predictors and positive outcomes from childhood to early adolescence. Journal of Applied Developmental Psychology, vol. 52, pp. 114–125. Sept. 2017, Access Jan. 16, 2023. doi: 10. 1016/j.appdev.2017.06.004 [Online]. Available: https://www.sciencedirect.com/science/article/pii/S0193397316302040
[24] M. Stern, and S. Hertel, "Relationship between maternal scaffolding and preschooler's metacognitive strategies in a problem-solving situation." Learning and Instruction, vol. 80, pp. 1-11, Aug. 2022, Accessed 18 Jan, 2023. doi:10.1016/j.learninstruc.2022.101631 [Online]. Available: https://www.sciencedirect.com/science/article/pii/S0959475222000524
[25] H. Zhang, and D. Whitebread, "Linking parental scaffolding with self-regulated learning in Chinese kindergarten children," Learning and Instruction, vol. 49, pp. 121–130. June 2017, Accessed 30 Jan, 2023. doi:10.1016/j.learninstruc.2017.01.001 [Online]. Available: https://www.sciencedirect.com/science/article/pii/S0959475217300063
[26] A. R. Clausell, "Maternal scaffolding and first graders' near and far transfer on problem-solving task," M.S. Thesis, University of California State, 2016. [Online]. Available: https://scholarworks.lib.csusb.edu/etd/283
[27] J. Sun, and N. Rao, "Scaffolding preschool children's problem solving: A comparison between Chinese mothers and teachers across multiple tasks," Journal of Early Childhood Research, vol. 10, no. 3, pp. 246-266. Oct. 2012, Accessed Jan 11, 2023. doi:10.1177/1476718x11415578 [Online]. Available: https://journals.sagepub.com/doi/10.1177/1476718X11415578
[28] E. E. Maccoby, and J. A. Martin, "Socialization in the context of the family: Parent–child interaction," in Handbook of Child Psychology: Vol. 4. Socialization, Personality, and Social Development, 4th ed., P. H. Mussen & E. M. Hetherington, Ed., New York: Wiley, 1983, pp. 1-101.
[29] M. Gauvain, B. I. Fagot, C. Leve, and K. Kavanagh, "Instruction by mothers and fathers during problem solving with their young children," Journal of Family Psychology, vol. 16, no. 1, pp. 81–90. March 2002, Accesses Feb 2, 2023. doi:10.1037/0893-3200.16.1.81 [Online]. Available: https://www.researchgate.net/publication/11449941_Instruction_by_mothers_and_fathers_during_problem_solving_with_their_young_children
[30] W. S. Grolnick, S. T., Gurland, W. DeCourcey, and K. Jacob, "Antecedents and consequences of mothers' autonomy support: An experimental investigation," Developmental Psychology, vol. 38, no. 1, pp. 143–155. Jan. 2002, Accessed Jan 23, 2023. doi: 10.1037/0012-1649.38.1.143 [Online]. Available: https://psycnet.apa.org/record/2001-10047-011
[31] D. Leyva, C. S. Tamis-lemonda, and H. Yoshikawa, "What parents bring to the table: Maternal behaviors in a grocery game and first graders' literacy and math skills in a low-income sample," The Elementary School Journal, vol. 119, no. 4, pp. 629–650. April 2019, doi: 10.1086/703104
[32] S. Goldstein, and J. A. Naglieri, Handbook of executive functioning. New York, NY: Springer, 2014.
[33] A. A. S. N. A. Pucangan, S. K. Handayanto, and H. Wisodo, "Pengaruh scaffolding konseptual dalam problem based learning terhadap kemampuan pemecahan masalah," Jurnal Pendidikan: Teori, Penelitian,

dan Pengembangan, vol. 3, no. 10, pp. 1314–1318. Oct. 2018, Accessed Jan 16, 2023. doi: 10.17977/JPTPP.V3I10.11661 [Online]. Available: http://journal.um.ac.id/index.php/jptpp/article/view/11661

[34] S. Sutiarso, M. Coesamin, and N. Nurhanurawati, "The effect of various media scaffolding on increasing understanding of students' geometry concepts," Journal on Mathematics Education, vol. 9, no. 1, pp. 95–102, Jan. 2018, Accessed Feb. 2, 2023. doi:10.22342/jme.9.1.4291.95-102 [Online]. Available: https://www.researchgate.net/publication/322763097_The_Effect_of_Various_Media_Scaffolding_on_Increasing_Understanding_of_Students'_Geometry_Concepts

[35] D. Wood, "The why? what? when? and how? of tutoring: The development of helping and tutoring skills in children in literacy teaching and learning," International Journal of Early Reading and Writing, vol. 7, pp. 1-32, 2003.

[36] G. J. Privitera, Research methods for the behavioral sciences, 3rd ed. Thousand Oaks, California: SAGE Publications, 2022.

[37] A. Ross, and V. L. Willson, Basic and advanced statistical tests, Rotterdam: Sense Publishers, 2017.

[38] N. Spadafora, and T. Downes, "Scaffolding in learning," in Encyclopedia of Evolutionary Psychological Science, T. Shackelford & V. Weekes-Shackelford, Ed. Switzerlang: Springer Nature Switzerland AG, 2020, pp. 1-4.

[39] J. Earhart, and I. Zamora, "Achievement together: The development of an intervention using relationship-based strategies to promote positive learning habits," Infants and Young Children, vol. 28, no. 1, pp. 32-45, March 2015, Accessed Jan. 2, 2023. doi:10.1097/IYC.0000000000000023 [Online]. Available: https://www.researchgate.net/publication/266023904_Achievement_Together_The_development_of_an_intervention_using_relationship-based_strategies_to_promote_positive_learning_habits._Infant_and_Young_Children_Journal

[40] S. I. Hammond, U. Müller, U., J. I. M. Carpendale, M. B. Bibok, and D. P. Liebermann-Finestone, "The effects of parental scaffolding on preschoolers' executive function." Developmental Psychology, 48, 271–281. Jan. 2012, Access Jan. 17, 2023. doi: 10.1037/a0025519 [Online]. Available: https://pubmed.ncbi.nlm.nih.gov/21928877/

[41] Q. Huang, J. Sun, E. Y. H. Lau, and Y. L. Zhou, Y. "Linking Chinese mothers' and fathers' scaffolding with children's initiative and mathematics performance A moderated mediation model," Early Childhood Research Quarterly, vol. 59, pp. 74–83. Jan. 2022, Accessed Jan. 18, 2023. doi:10.1016/j.ecresq.2021.11.001 [Online]. Available: https://www.sciencedirect.com/science/article/abs/pii/S0885200621001241

[42] J. Sun, and Y. Tang, "Maternal scaffolding strategies and early development of self-regulation in Chinese preschoolers," Early Child Development and Care, vol. 189, no. 9, pp. 1525-1537, Nov. 2017, Accessed Feb. 1, 2023. doi:10.1080/03004430.2017.1395874 [Online]. Available: https://www.tandfonline.com/doi/full/10.1080/03004430.2017.1395874

[43] D. B. Conner, and D. R. Cross, "Longitudinal analysis of the presence, efficacy and stability of maternal scaffolding during informal problem-solving interactions," British Journal of Developmental Psychology, vol. 21, pp. 315–334. Sept. 2003, Accessed Jan. 19, 2023. doi:10.1348/026151003322277720 [Online]. Available: https://bpspsychub.onlinelibrary.wiley.com/doi/abs/10.1348/026151003322277720

[44] K. Ann, "The process of scaffolding in conversation: Who does it best and why?," Ph.D. dissertation, University of California, Merced, 2012.

## AUTHORS PROFILE

**Nellie Ismail** is a Senior Lecturer in the Department of Human Development and Family Studies, Faculty of Human Ecology, Universiti Putra Malaysia. She received her Ph.D. in Psychology from the National University of Malaysia. Her area of expertise is Developmental Psychology (Children and Adolescents). She is particularly interested in children's emotional and behavioral problems, children's temperament, children's problem-solving skills, and maternal scaffolding. She currently leads a project entitled 'The Effectiveness of Scaffolding Technique on Problem-Solving Skills among Preschool Children'. She has published numerous reputed national

and international peer-reviewed journals, proceedings, and chapters in books. She was also involved in a consultancy project to study the service quality of Tabika KEMAS in Malaysia. She has been a co-researcher for several research projects which are funded by Malaysian National Commission for UNESCO, MOE Fundamental Research Grant Scheme (FRGS), and Universiti Putra Malaysia. Besides, he has been selected as a manuscript reviewer for The Global Journal Al-Taqafah (GJAT), Pertanika, Journal of Child, Family, and Consumer Studies.

**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 the marital relationship, 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 Marital Health Scale that they developed based on their FRGS project. Rumaya has served as Consultant, Expert Panel, and Speaker at various agencies for program development, research program, 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 pertaining to marriage, family, and parenting. She is also active in community outreach programmes involving children and their families.

**Zainal Madon** is a registered counsellor with the Malaysian Board of Counsellors and has served as 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-institutionalisation 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 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 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 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).

**Mohamad Naqiuddin 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.