Developing Teaching Guidelines of Learning Numeracy through Game Card for Preschool Teachers

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Abstract: In facing the challenges of Industry 5.0, the younger generation, in particular, needs to master the field of STEM. Hence, efforts in raising students' interest in STEM should include introducing numeracy skills earlier. However, providing appropriate pedagogy is crucial in developing numeracy skills among preschool children as this becomes the foundation for their future numeracy skills. Based on previous research, learning through play could increase children's interest, enjoyment, attention span, and confidence. Preschool teachers agreed that learning should incorporate games and activities. However, in the Malaysian setting, there are fewer specific guidelines, games, activities, or situations that maximise numeracy learning in the class designed crucially in a preschool setting. This study intends to develop teaching guidelines of learning numeracy through play for preschool teachers. This study utilised a mixed-methods design, called a sequential explanatory strategy. Fifty preschool teachers were selected using a stratified sampling technique to complete a questionnaire on their beliefs and attitudes toward learning through play. Six of them were interviewed concerning the bases needed to implement learning through play in the class. The result revealed that preschool teachers have a high positive level for both beliefs and attitudes toward learning mathematics through play. Then, based on the interview, teachers listed the bases needed before, during, and after implementing learning through play. This study produces teaching guidelines based on the Input-Process-Output model, which encompasses before, during, and after the teaching and learning process of numeracy through play.

Keywords: Teaching guidelines, Learning through play, Numeracy.

1. Introduction

In the present world of the fifth industrial revolution, the demands for talents in science, technology, engineering, and mathematics (STEM) are very crucial as these become the crux of a country's development and economy. As important as it is, nevertheless, in the Malaysian context, the students have not displayed the essential interest in Mathematics and Science. It can be proved by the Education Ministry's 2020 Annual Report which detailed the percentage of students in STEM was 47.18 percent, with only 20.15 percent involving in pure science (Bernama, 2021). Due to the lack of interest in these two crucial areas, the Chairman of the National STEM Movement, Prof. Datuk Dr. Noraini Idris advocated on introducing STEM in the early stage of education (Sani R., 2018), hoping that it can nurture the interest in an earlier age. According to the Ministry of Education in Malaysia

(MoE), preschools and early primary schools should promote the potential of children in all aspects of development, encourage mastery of basic skills and foster positive attitudes, hence preparing them for later education. This further indicates the importance of introducing children to STEM education earlier, such as literacy and numeracy skills (Adam & Halim, 2019). It will have long-term implications on later STEM achievement (McClure, et al., 2017) and pursuit of a future STEM career (Sheehan, Hightower, Lauricella, & Wartella, 2018).

Early education is essential for numeracy development (Linder, Powers-Costello, & Stegelin, 2011; Hunting, Mousley, & Perry, 2012). Numeracy competencies that a child should have are counting (Aunio, et al., 2019; Aunio & Niemivirta, 2010; Gervasoni, Giumelli, & McHugh, 2017; Nelson & Powell, 2017; Dowker, 2017), numerals and words recognition (Powell & Fuchs, 2012; Nelson & Powell, 2017; Dowker, 2017), addition and subtraction concepts (Canobi, Reeve, & Pattison, 2003; Gervasoni, Giumelli, & McHugh, 2017). Nelson & Powell (2017) revealed that children struggling with procedural skills, counting, magnitude comparison, number recognition, and subtraction (Güven & Çolak, 2019) in numeracy tend to perform lower grades in later maths achievement (Nelson & Powell, 2017). Hence, providing appropriate and structured pedagogy and a deep teaching approach (İlhan-Beyaztas, 2019) is crucial in developing numeracy skills among preschool children as this becomes the foundation for their future numeracy skills.

The Education Ministry incorporates '*Learning while Playing*' among pre-schoolers in class, group, and individual activities. Play-based pedagogies are supported by Yahaya, Hanafiah, Zakaria, Osman, and Bahrin (2019), who stated that the effectiveness depends on the teacher's ability to create a meaningful and fun learning experience. It is in line with the findings from Rasid, Md Nasir, Singh, and Han (2020) that the classroom culture is the main factor contributing to the effective instructional practices in teaching mathematics. Supported by findings from Ke-Du (2019) that teachers are responsible for altering and modifying their daily lessons to match the students' needs and conditions. However, teachers still implement conventional pedagogies in teaching numeracy to children. Hence, the children will feel bored and have no interest because of materials, including no critical and creative skills nurtured in the classroom (Siong & Osman, 2018).

Generally, the overall length of children's attention span is 5 to 7 minutes (Juanga & Ressureccion, 2015; Güven & Çolak, 2019; Mahone & Schneider, 2012). Nevertheless, exposing them to toys designed to develop numeracy skills could increase children's attention span up to three times (Moyer & Gilmer, 1954). Notably, preschool teachers have difficulties in implementing play-based pedagogies. As revealed by previous research, teachers have a time constraint to prepare an engaging lesson, with their readiness at a moderate level (Jekri & K Han, 2020), lack of adaptation, and lack of resources (Güven & Çolak, 2019; Siong & Osman, 2018).

But, previous researchers agreed that preschool teachers should teach mathematics in a fun and exciting way which include attractive toys or materials as part of learning materials (Lee & Ginsburg, 2007; Tandika, retrieved 2020; Tan & Rao, 2017; Ali & Mukhtar, 2017). These activities were suggested to be conducted in small groups. While learning and doing the activities, teachers needed to be sensitive towards their children's overall emotional well-being. Their research also revealed that a good time to teach children about the related concept of mathematics was when children showed interest in mathematics. According to Piaget, children learn through repeated actions and behaviours on objects around their environment, and develop working theories through these repeated actions (Piaget, 1953; Piaget, 1959; Piaget, 1970).

Various researchers have supported that children learn numeracy by engaging in daily and children-centred activities (Selmi, Gallagher, & Mora-Flores, 2015). Some researchers found that teachers agreed that games were useful, pedagogically effective, and could enable children who played regularly to improve numeracy skills, especially in counting and number recognition (Godfrey & Mtebe, 2018; Sani & Yunus, 2018). Therefore, preschool teachers need to develop appropriate play-based pedagogies as their tools for teaching and learning planning (Cohrssen & Niklas, 2019). Unfortunately, experts from America stated that teachers did not emphasise using manipulative objects in their teaching and learning.

Tan and Rao (2017) suggested a need to develop structured activities for preschool teachers; that was direct instruction of specific knowledge and skills for literacy and numeracy development. Structured activities should employ various strategies and hands-on experiences to retain the children's attention (Hourigan, Leavy, & Carroll, 2016). Through activities, children can look, manipulate, make

gestures, count, and compare quantities in objects (Bautista, Ong, Habib Mohamed, Eng, & Bull, 2019). Hence, learning through play that engaged physical activity could increase children's confidence level and understanding of learning mathematics (Vetter, O'Connor, O'Dwyer, & Orr, 2018; Garris, Ahlers, & Driskell, 2002; Helmi, Mohd-Yusof, & Hisjam, 2019). Smith, Douglas, and Cox (2019), together with Wanjiku & Koech (2018), stated a relationship between teachers' participation in collaborative activities and preschoolers' attainment. As a result, The Northern Territory Department of Education in Northern takes a step ahead by instructing the development of the NT Preschool Maths Game to assist teachers in incorporating play-based mathematics in their curricula (Cohrssen & Niklas, 2019). Therefore, this study aims to develop a teaching guideline in numeracy to assist teachers in implementing learning through play in their teaching and learning process.

Previous researchers proposed a theory or model of learning through games or serious games (Dragon Box for primary students), but did not focus on children. Each game selected usually answers the what, why, and how questions preschool teachers may ask while incorporating play-based mathematics in their curricula.

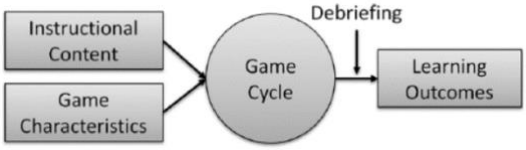

Fig. 1 Input-Process-Output model. Adapted from (Garris, Ahlers, & Driskell, 2002)

Refer to Figure 1, the input-process-output model of serious games generally suggests that instructional and game characteristics are the inputs to a game cycle that will produce an effective learning process (Garris, Ahlers, & Driskell, 2002). For children, the debriefing stage is a vital process. Debriefing can be defined as reviewing and analysing actions that occurred in the game itself (Garris, Ahlers, & Driskell, 2002). This stage allows teachers to transform the game into learning experiences among children, and it includes the discussion of mistakes and corrective actions in the classroom.

Prince (2013) proposed a student-centred learning continuum that segmented learning into four zones: lecture active (Zone 1), informal group (Zone 2), structured team activities (Zone 3), and problem drives the course (Zone 4). Zone 2 is known for informal cooperative learning (ICL) (Smith, Douglas, & Cox, 2009). Teachers need to divide the zone into three activities in planning for a lesson: opening, intermittent discussion, and closing.

Some requirements need to be considered in developing structured learning through play in preschool. These include considerations such as adequate materials, age of children, affordable, readily available in the class, durable and safe, ability to stimulate learner's sense and interests, variety in forms, and visible to all learners (Tandika, retrieved 2020). He believed that children experience meaningful learning as they can see, touch, taste and even smell. Therefore, the use of correct materials is essential.

Landers (2015), Koridon (2016) and Smith, Douglas, & Cox, (2009) stated that the roles of teachers were to provide the learning content and debriefing process to achieve the instructional goals. The adaptation of the games to the students' ability will improve students' behaviour towards learning. Landers (2015) suggested using Social Play Continuum to observe child-initiated play and teacher-directed activities whenever the aim was for the directed task to engage children with their peers. Garris, Ahlers, and Driskell (2002) proposed the game features as a game cycle, a repeating cycle of user judgments, behaviour, and players' feedback.

In order to ensure the game is adequate, Koridon (2016) listed three essential factors: the teacher, the learning objectives, and the game. The teacher's role must be reviewed in the stage of the game, the kind of learning content and learning objectives, the game characteristics, and the in-game elements (Koridon, 2016). Each teacher needs to divide their teaching activities into several categories: children's ability, learning techniques, and interest (Jackie, A. Ghani, & Elham, 2016). Broadhead (2006) explained that as the children start cooperative learning, the reciprocity between peers increases; the language and action become more complex, where reciprocal language and reciprocal action begin to combine. Hence, following a complete teaching guideline for learning through play could establish meaningful learning for children, thus helping enhance numeracy skills among children.

This study aims to develop a teaching guideline for implementing learning through play for preschool teachers, to develop numeracy skills among children. Specifically, the objectives addressed are:

a) To determine teachers' beliefs and attitudes towards learning numeracy through play
b) To identify the bases needed for developing teaching guidelines towards learning numeracy through play
c) To produce teaching guidelines for learning numeracy through play for preschool teachers

2. Methodology

This study employed a mixed-methods design, called a sequential explanatory strategy. This method is characterised by first collecting and analysing quantitative data, followed by collecting and analysing qualitative data. The collection of qualitative data is drawn from the results in quantitative results (Creswell, 2009). The quantitative method was used to determine preschool teachers' beliefs and attitudes in implementing learning through play as their pedagogy in teaching numeracy. Meanwhile, a semi-structured interview was conducted in the qualitative method to discover the teachers' concerns in implementing this pedagogy.

2.1 Subject

A stratified random sampling technique was employed to identify the preschool teachers in a district in Selangor, Malaysia, with a minimum of three years of teaching experience to assure that the respondents have experienced or are familiar with the syllabus and school system, as well as understand kids' needs and behaviours. Hence, 50 preschool teachers were selected as a sample in this study. Then, six of them, who have the experience of using any educational game card in teaching mathematics, were selected for the interview session. Their input will be used to develop the teaching guidelines for the numeracy game card.

2.2 Instrumentation

A set of questionnaires was adapted from two studies from "Correlation between Kindergarten Teachers' Attitudes toward Teaching Science and Their Teaching Practices" by (Gheith & Al-shawareb, 2016). There were 32 items, with 15 items related to teachers' beliefs and 17 about teachers' attitude in implementing learning through play in teaching numeracy. The Likert scale used ranges from 1 to 10, which refers to the level of agreement for the respondent to tick. The reliability coefficient for this questionnaire was computed by using Cronbach's Alpha is .936.

3. Finding

This section presents the analysis of the survey conducted. Descriptive analyses were used to analyse the data.

1) An Analysis on teachers' beliefs and attitudes towards learning numeracy through play.

As shown in Table 1, the overall scores of teachers' beliefs (Mean = 8.54; SD = 0.81) and attitudes (Mean = 8.54; SD = 0.91) towards learning through play in teaching numeracy are presented. This indicates the high level of agreement for this teaching style.

Table 1. Descriptive statistics of two domains (teachers' beliefs and attitudes)

Domain	Overall score	
	Mean	SD
Teachers' beliefs teaching numeracy through play	8.54	0.81
Teachers' attitudes teaching numeracy through play	8.54	0.91

Table 2 presents the mean score of teachers' beliefs and attitudes according to their qualifications and years of teaching. Based on the results, teachers graduated with early childhood education scored (M = 8.60; SD = 0.67) and (M = 8.61; SD = 0.88) greater than the teachers who did not graduate in early childhood education (M = 8.43; SD = 1.03) and (M = 8.42; SD = 0.98), followed by very experienced teachers' scored (M = 8.59; SD = 0.54) and (M = 8.43; SD = 0.82) for belief and attitude respectively.

Table 2. Descriptive statistics for Teachers' Demographic Background

Demographic Background		Beliefs		Attitudes	
		Mean	SD	Mean	SD
Qualifications	Have early childhood education certificate	8.60	0.67	8.61	0.88
	Does not have early childhood education certificate	8.43	1.03	8.42	0.98
Years of teaching	Novice teacher	8.40	0.98	8.63	1.01
	Experienced teacher	8.58	0.91	8.59	0.94
	Very experienced teacher	8.59	0.54	8.43	0.82

T-test conducted reveals no significant difference in their agreement between the qualifications ($p>.05$). Meanwhile, ANOVA test also proved that there was no significant difference in the agreement of implementing learning through play among the years of teaching.

Table 3. T-test and ANOVA test

	Belief		Attitude	
Qualifications	T	p-value	t	p-value
	0.688	0.495	0.713	0.480
Years of teaching	F	p-value	F	p-value
	0.137	0.872	0.224	0.801

2) What bases are needed for developing teaching guidelines for learning numeracy through play?

The following section discusses the teacher's views on the bases needed to implement play elements in teaching numeracy for preschoolers. Owing to some constraints, only a few themes and respondents' results have been discussed. There were six preschool teachers selected as respondents, and each teacher is represented as Teacher A, B, C, D, E, and F.

Table 4 shows the teacher's view on the basis needed for the implementation of play-based learning among children. The researcher divided the opinions into a few themes: Lesson plan, learning objectives, materials, checklist, teacher's roles, and challenges. The first theme was '*lesson plan*', which described the teacher's emphasis on preparing the lesson plan. The evidence from Teacher A's statement, "..teachers need to prepare attractive lesson plans according to the syllabus." The second theme, '*learning objectives*' explained the teachers' need to construct a learning objective that could incorporate suitable games and activities. The third theme '*materials*' described the right and sufficient materials used for the lesson as mentioned by Teacher C and E, "… enough, since materials such as blocks and flashcards are provided by the school. But the teacher needs to be creative to use the materials to make it attractive." The fourth theme, '*checklist*' illustrated the need for a checklist for teachers to keep track of, for instance, the lesson plan, materials used, and questions posed during the lesson. The fifth theme, '*teacher's role*' explained teachers' realisation as to their main role towards their students. The sixth theme, '*challenge*' discussed teachers' challenges before, during, and after the lesson and game.

Table 4. Teacher's interview summarization.

Lesson plan	"Teachers need to prepare attractive lesson plan according to the syllabus", Teacher A. " Lesson plan is important. It should be prepared and make sure it is suitable for the pupils, activities, topic, class, and materials selection", Teacher B "..it is important for the teacher to know the flow of the game and expert to conduct the game to make sure it matches topic selection.." Teacher C ".. Headquarter provided the basic lesson plan, but it depends on the teacher how to adapt that lesson plan." Teacher D
Learning objectives	"Learning objectives should be parallel with the planned activities so that teachers can identify the children's competencies. A teacher needs to identify a suitable game with the objectives." Teacher A. "Need, the teacher needs to adapt the game with the learning objective.." Teacher B " …we cannot just select the game without following the learning objectives.." Teacher D "it's a need since the aim of playing the game is to achieve the learning objectives.." Teacher F
Materials	".. so far, all the materials are enough for the pupils and topic selected.." Teacher A and B "… enough, since materials such as blocks and flashcards are provided by the school. But teacher needs to be creative to use the materials to make it attractive." Teacher C and E "… materials provided in lesson plan just for normal lesson plan… teacher need to find other initiatives to find other materials or modified the available materials, then determine whether it is suitable with the pupils." Teacher D
Checklist	"I need checklist form, anecdote record, and observation record." Teacher B "Preschool Assessment Instrument to ensure the game conducted suits with the learning objectives." Teacher C. "List of materials for preparation based on the lesson plan. The teacher need to check the questions involved in the game can evaluate children's understanding." Teacher D. "A Checklist material to ensure the materials is enough for the game and has backups in case the materials is broken." Teacher F.
Teacher's role	".. we act as a facilitator, we need to ensure children understand the game." Teacher E. " Teacher is a facilitator. Assists the children when playing the game. For me, I like them to explore by themselves but after a clear instruction given." Teacher F
Challenges	<u>Before</u> "..sometimes I'm not confident to conduct the game since we don't know whether the game is attractive or not." Teacher A. "I'm lack of ideas to create or adjust the materials for the game." Teacher B "I need time to prepare the materials for the game as compared to the traditional method." Teacher C "Teacher needs to brief the related learning objectives with the game." Teacher F <u>During</u> "Make sure all pupils involve in the game." Teacher A and F. "Time constraint." Teacher B and E "Children did not interest to the game and did not get any input from the game." Teacher C. "Teacher needs to ensure pupils understand the game so that the game can run smoothly." Teacher D <u>After</u> "Make sure that children could achieve the learning objectives." Teacher A, D E and F. "Learning objectives could be achieved if the children failed to relate the game with the learning objectives. Teacher B

4. Discussion and Conclusion

In conclusion, regardless of their amount of experience on teaching, all preschool teachers highly agree on learning through play. The result is contradicting the previous research conducted by Karatas, Guven, Öztürk, Arslan and Gürsoy (2017), which indicated that more experienced teachers tend to include children's active participation in the classroom as compared to less experienced teachers. The result of teachers' beliefs and attitudes showed no difference between their educational backgrounds. All in all, the result of the study depicted the agreement of preschool teachers in teaching numeracy in fun and exciting ways and good feelings (Lee & Ginsburg, 2007; Tandika, retrieved 2020; Tan & Rao, 2017; Tandika, retrieved 2020). According to Lee and Ginsburg (2017), teachers should not push children while learning numeracy since they have different interests, aptitudes, and abilities in mathematics. Children will easily understand when they have shown their interest in mathematics. This can be done by involving children in small group activities and creating a joyful environment in the classroom. Zosh, et al., (2017) suggested that optimal learning through play happens when the activity encompasses five characteristics: 1) joyful, 2) meaningful, 3) actively engage, 4) iterative, and 5) social interactive.

This research utilised the Math Zap Card Game that fits all five characteristics. Math Zap Card Game promotes joyful learning where the children will play in small groups and compete to guess the correct/similar value between each card as fast as possible. Children will play without realising that they are enhancing their numeracy skills. In addition, as they are playing the game, the meaningful learning and iterative process would happen as they would discuss the number relational during the game by asking why and how (e.g.: 2+3, 5, and five dotted symbols are equal) among each other to stand their correct guess. During the discussion, all members in each group were actively participating. Hence, this game card could enhance children's social interaction while having a deeper understanding of numeracy.

Nevertheless, the preschool teachers should develop the right play pedagogies which contain characteristics of the game, and flow of the learning (before, intermittent, and afterward), thus, to make the lessons run effectively (Sani & Yunus, 2018, Cohrssen & Niklas, 2019). The Input-Process-Output model for the serious game is adapted from Garris, Ahlers, & Driskell (2002) and can be the reference when developing a lesson plan using a card game. Moreover, the teacher's role is vital during the game, especially during debriefing time (Landers, 2015; Koridon, 2016; Jackie, A. Ghani, & Elham, 2016). Teachers could transform the game into learning experiences among children during debriefing time, including discussing mistakes and corrective actions in the classroom. Thus, teachers are encouraged to discuss number relations with the children while playing the Math Zap Card Game. Hence, this study wants to share simple teaching guidelines to preschool teachers in preparing a lesson plan in numeracy that incorporates play activities.

The guidelines consist of three phases by following the Input-Process-Output model: before, during, and after implementation of the learning through play in the numeracy classroom.

a) Before

Firstly, the teacher should analyse the content learning. Then, the teacher sets the number of learning objectives needed in that topic. Teachers should measure the appropriate time allocation for teaching sessions (or revise prior knowledge), explanation of the game instructions, the game, and evaluation. Teachers can determine the game suitable with the available materials and time allocated, or teachers can modify the materials to fit the learning objectives or buy the new materials. In addition, the teacher is advised to choose a simple game to provide a simple flow for the children to understand. Teachers need to ensure that the selected game offers meaningful learning for the children by emphasizing children's interests, communication, hands-on experience, social skills, and self-confidence. As in this research, teachers used Math Zap Card Game at junior level. Hence, the teacher chose a specific content learning that suits this game and understood the card game's instruction.

b) During

In this phase, the teacher should act as a facilitator. This is the time for the teacher to ensure all children will achieve the learning objective while playing the game by asking or provoking children with supportive questions related to the learning objectives. Firstly, the teacher informs the children about the learning objectives and the game rules. The teacher may demonstrate the game before starting

it. In this phase, the teacher should do the debriefing. The debriefing stage allows the teacher to interact with the children based on their understanding. At this point, the teacher will help the children transfer the game into a learning experience that suits the learning objective (Garris, Ahlers, & Driskell, 2002). This stage is very imperative as it will include the discussion of mistakes and corrections.

As for Math Zap Card Game, teachers will provoke the children to develop mathematical reasoning of the numeral relations. Besides that, the teacher will record the children's social play checklist. The social play checklist includes the children's social play stages (beginning, intermediate and advanced play behavior), understanding emotions, self-regulation, flexibility, problem-solving skills, seeking assistance, participating in the group, and following in group (Adapted from Mora-Social Skills checklist, 2007). Teachers could allow the children to repeat the game card from 3 to 4 rounds to achieve the learning objectives. This game card will take around 10 minutes to complete, depending on how fast children will finish all the cards on them.

c) After

It is advised for the teacher to give a short break to the children after the game. Then, the teacher can evaluate children by providing a quick task to measure their attainment, or the teacher may ask children's feedback by asking questions related to the learning objectives. For this research, teachers evaluated the children's ability to recognize the numbers, words, and roman numbers, then tested the children's mathematical reasoning in explaining the numeral relational, such as 2+1, 3, three, and 5-2. Table 5 below shows the teaching guidelines attached to the example of using Math Zap Card Game, junior-level.

Table 5. Teaching Guidelines for kindergarten teachers in teaching numeracy using Game Card.

	BEFORE	
No	**Step**	**Example**
1	Choose specific content	Topic 4.2: Know the concept of 1 to 10
2	Set the learning objectives	At the end of the topic, children should be able to 4.2.1 count objects 1 to 10 4.2.2 match the symbol 1 to 10 with the object 4.2.3 match the number of the object with symbols 1-10 4.2.4 count decreasing 10 to 1
3	Time allocation	Lecture/recap the prior knowledge: 15 minutes Organizing informal group activities: 10 minutes Informal group activities/game: 10 minutes Structured group activities/game: 30 minutes (including debriefing phase) Evaluation: Short task (after a break) – 10 minutes
4	Materials	Mathzap Game card (sample) contains various representations of 1 to 10 such as symbol, object, word, and roman number. (4 to 5 children per group)
5	Rules of the game	Shuffle the cards (face down), divide each member equally (face down), each player draws a card on a pile according to their turn (face up), if any player recognizes a similar value (e.g: card 1 and card ONE), that player will Zap on the card quickly and win all the cards on the pile.
		DURING
6	Teacher's role – as a facilitator	1. Briefing – learning objectives and flow of the game 2. Debriefing –along with the game, discussion about the numeral relational, and develop mathematical reasoning 3. Children social skills checklist
		AFTER
7	Evaluation	The short task to children/children's feedback

In establishing a deep teaching approach, especially for early childhood, it is vital to have a proper guideline. Hence, these guidelines will help teachers to achieve all the learning objectives. In

addition, preschool teachers can use the teaching guidelines in enhancing numeracy skills through play. It is essential to diversify in teaching, for an instance, by integrating innovation to increase children's interest, attention span, understanding, and STEM values.

5. Limitation and Recommendation

The guidelines were developed based on the interview conducted with those teachers who have experienced implementing game card in teaching and enhancing numeracy among kindergarten students. Besides that, the guidelines have been validated by three senior, experienced kindergarten teachers. Nevertheless, for future research, it is suggested to measure the effectiveness of the guidelines in enhancing numeracy skills by using game cards among children by employing an experimental research design.

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7. Author Contribution

Author 1 prepared the literature review, wrote the research methodology and overlooked the writeup of the whole article. Authors 2 and 3, carried out the analysis, interpreted the findings, Author 4 and 5 carried out the field work, and refined the whole article.

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