

The Selection of Meaningful Approach to Assess Children's Science Process Skills

Nordin Mamat¹

Department of Early Childhood Education, Faculty of Education and Human Development
Universiti Pendidikan Sultan Idris

Nor Mashitah Mohd Radzi²

Department of Early Childhood Education, Faculty of Education and Human Development
Universiti Pendidikan Sultan Idris

Loy Chee Luen³

Department of Early Childhood Education, Faculty of Education and Human Development
Universiti Pendidikan Sultan Idris

Sopia Md Yassin⁴

National Child Development Research Centre
Universiti Pendidikan Sultan Idris, Malaysia.

DOI Link: <http://dx.doi.org/10.6007/IJARBSS/v7-i4/2897>

Published Date: 24 April 2017

Abstract

This paper aims to produce an instrument of observation in the selection of meaningful approach to assess children's science process skills. This instrument has four categories. First of all, the use of the type of approach encompasses the approaches of learning through play, thematic, integrated, mastery, contextual and project. Secondly, the suitability of the selection of approach encompasses relevance, parallelism, engaging. Thirdly, meaningful teaching encompassing the interaction or discussion, stimulation, involvement, curiosity and questioning and answering. Fourth, children's science skills activities that cover problem solving, reasoning, looking into the process, analytical, inquiry and reflection. Every item in every category has four Likert scales. It is hoped that these items of observation develop can be used to assess the children science process skills.

Keywords: Approach, Meaningful Approach, Suitability Approach, Science Process Skills, Children

Introduction

Educators have to select meaningful teaching for the evaluation of children's science process skills. Four categories of meaningful approaches in the teaching strategies cover firstly, the use of the types of approach. Secondly, the suitability of the type of approach. Thirdly, meaningful teaching. Fourthly, children's science skills activities. Items of observation for the use of the type of approach encompass the approaches of learning through play, thematic, integrated, mastery, contextual and project. The items of observation for the suitability of the approaches encompass relevance, parallelism and engaging. For meaningful teaching, the items of observation cover interaction or discussion, stimulation, curiosity and questioning and answering. The items of observation for children's science skills activities cover problem-solving, reasoning, looking into the process, analytical, inquiry and reflection. The items of observation seek to identify the suitability of the observation instrument in the selection of meaningful approaches to evaluate children's science process skills.

Background

A meaningful approach in children's teaching and learning involves the approaches of learning through play, thematic, integrated, mastery, contextual and project (PERMATA Curriculum, 2013; National Preschool Curriculum Standard, 2016).

The selection of meaningful approach deemed suitable for the teaching and learning is very important to assess children's science process skills. Teachers or educators need to reflect and evaluate children for every teaching session and the teaching carried out to identify the achievement of children's skills and the effectiveness of the teaching strategies adopted.

Problem Statement

An observation needs to be done during the teaching and learning to identify children's achievement and the effectiveness of the teaching strategies used (Bonner, 2012). However, this is often neglected. Thus, there is a need to have an appropriate instrument that can assess the selection of strategy that is meaningful to assess children's science process skills.

Nowadays, the problem faced is the lack of instrument of observation to assess children's science skills. Teachers have the problem to choose the appropriate teaching approach in the teaching strategy. Thus, they have to be constantly prepared to take in the changes and challenges and enhance the skills and knowledge in children's early education especially science process skills for these youngsters (Al-Hooli, 2001; Vartuli, Snider & Holley, 2016).

Literature Review

The literature review includes approach, the learning through play approach, thematic approach, integrated approach, mastery approach, contextual approach, project approach and science process.

Approach

The teaching approach selected must go well with the children's development level as it is an approach that considers the age, development, talent and interest in the teaching process. The approach in nursery and preschool covers learning through play, thematic, integrated,

mastery, contextual and project-based approaches in the process of education (Roy, 2006; Gloria, 2008; Kaplan, 2016; Elfrink, et. Al, 2017; Loy, 2017).

Learning Through Play Approach

Playing is a way of teaching or handling that gives a direct real life experiences to nursery and preschool children. Playing as teaching and learning can give happiness, enjoyment and satisfaction to children throughout their learning. Through the pedagogy of playing, children are able to grasp the concept and master a skill delivered by the teacher. Playing in general can be defined as any activity that gives happiness, enjoyment and satisfaction to babies and children. Playing activities also take place spontaneously. Playing is a process for children to get to know themselves and the world around them. It can give the actual experience to the babies and the children. Playing activities also help children learn about a concept and skill that can be put to use in everyday life. Through this activity, they dominate the concept of space to play and life skills. The activity helps boost the cognitive, psychomotor and affective development of the babies and children. In general, the playing approach is a teaching that applies learning through playing. Playing while learning can be applied in the activities in nursery, also in teaching and learning activities at preschool level (Roy, 2006; Gloria, 2008; Loy, 2017).

Thematic Approach

The thematic approach involves certain themes that have been selected and implemented in the teaching and learning throughout the years. The themes are arranged from easy to more challenging and carried out to fulfil the teaching and learning requirements. This approach takes into account different developments of children. The selection and implementation of teaching and learning themes consider the concept, skills and content of children's learning. As an educator, when making the theme selection for teaching and learning, you need to ensure that the theme has to be *starting from easy to difficult themes*, going across all components or core in the curriculum, based on the affordability and experiences of the children, current and related to time and event, the sources and materials of teaching used (Roy, 2006; Gloria, 2008; Loy, 2017).

Integrated Approach

The teaching and learning that apply the integrated approach can train the minds of the children and enable them to memorise. This approach involves children actively in the teaching and learning process. The execution of this approach integrates two or three skills that have to be mastered by children at any one time. Other than skills, children are also given the knowledge. Moral and spiritual developments of the children are also taken into account during the teaching and learning process. As this approach is carried out, teachers or educators have to use their daily experiences on the children in the teaching and learning process. As teachers or educators, you are reminded that the activity done needs to involve all children and use all senses. This teaching and learning method can help children to understand the reality of life out there. An integrated approach involves, the integration between components for nursery children and the core for preschool children, the integration of activities focusing on teachers or educators and of children, the integration of children, skills, morality and spirituality, the integration of activities in and out of class using appropriate space, the integration of various methods and techniques of teaching and learning (Roy, 2006; Gloria, 2008; Loy, 2017).

Mastery Approach

The mastery learning serves to be the teaching and learning approach that focuses on children's mastery in any given knowledge or skills taught. To master a knowledge or skill, teachers or educators need to provide an appropriate learning environment and give adequate time to children during the process of teaching and learning. Mastery learning refers to the idea and practice of teaching and learning done individually that can help children learn consistently. When planning and carrying out the activity, teacher or educator needs to make sure that every child has to master the standard of learning planned in a learning unit before proceeding to the next unit. Mastery learning is a planned teaching and learning approach carried to ensure that every child who follows the teaching or activity can master the teaching objective or standard in the learning unit before going on to the next learning unit. Mastery learning is the idea and practice of the teaching and learning for individuals planned and executed to guide children to master the knowledge or skills systematically. This method of learning gives ample time to children throughout the teaching and learning process. Teachers or educators have to apply mastery learning in high quality so that they can help children who have problems in their studies. Mastery learning focuses on children mastering knowledge or skills delivered. Children are able to master them well if the learning environment provided is appropriate. Teachers or educators must be reminded that children need enough time to master certain knowledge or skills (Roy, 2006; Gloria, 2008; Loy, 2017).

Contextual Approach

Contextual Learning refers to the holistic teaching and learning process. The aim of this learning is to motivate children. This learning closely relates with the daily lives of children. Matters related to culture, society, family and personal life can be integrated with the teaching and learning. As a teacher or educator, you need to relate to daily situations in the teaching and learning process. Children will be more emphatic towards the learning and get real experiences if the teaching and learning process involves things in daily life. Contextual learning is the concept of learning where teachers or educators integrate daily life situations in the teaching activities. Teacher's plan and guide children in doing the tasks or projects. New language or skills are obtained through discovery, which is the learning outcome from the children's exploration, self-execution and experience. This type of learning does not come in the form of memorizing, gathering facts, but it is more of a process of constructing knowledge compatible with children's own experiences. They learn through self-experience and obtaining knowledge from the actual world. The learning objective or standard becomes more meaningful for children because they are able to understand the teaching activities and gain true experiences. Children are able to experience real life situations. This learning gives room for children to explore, do and experience things themselves (Roy, 2006; Gloria, 2008; Loy, 2017).

Project Approach

Project based learning can serve as one of the platforms for meaningful teaching and learning to both nurse and preschool children. It gives the opportunity to children to explore. They carry out direct exploration and engage themselves actively in the activities. This learning goes well with children's curiosity. Project based learning is active learning that can give the actual experience to children. They are able to obtain knowledge and skills after they have explored and tried something new. New experiences, knowledge and skills are important for children to learn about their surroundings (Roy, 2006; Gloria, 2008; Loy, 2017).

In sum, the implementation of the teaching strategies that applies the playing approach, the thematic approach, the integrated approach, the mastery approach, the contextual approach as well as the project-based approach in education needs to be planned carefully so they will benefit children, especially when it comes to enhancing their science process skills.

Science Process

Children's science process skills encompass the skills of problem solving, finding reasons and looking into the process, analytical, inquiry and reflection. Problem-solving refers to the method of teaching and learning in the form of exploration to get the outcome or answer. Finding the reasons seeks to identify the root cause of why something happens. In children's teaching and learning, they make an effort to find answers. They have the skills to look into the process in learning. Children's learning stresses more on the process than the outcome. Children are encouraged to make observation and take note of the learning process when doing an experiment. Analytical skill is the skill to identify the concept that is influenced by another concept in the teaching and learning processes. Inquiry skill refers to the learning process where children explore while experimenting to get answers. Reflection is the act of revisiting an activity that has been carried out to identify the strengths and weaknesses and ways of overcoming the weaknesses (Al-Hooli, 2001; PERMATA Curriculum, 2013; National Preschool Standard Curriculum, 2016).

Items Development in the *Observation Instrument*

Four instruments have been produced, firstly the use of the approach-type, secondly the suitability of the selection of approach, and the third one is meaningful teaching. Next, the fourth one is children's science skills activities.

Table 1
Items of observation for the use of the type of approach

First Category: The use of type of approach

The use of the type of approach is written in RPH and used in the teaching/activity

- learning through play
 - thematic
-

- integrated
- mastery
- contextual
- project

4	3	2	1
Using more than 2 types of approach in teaching.	Using 2 types of approach in teaching.	Using 1 type of approach in teaching.	Not using any in approach in teaching.

Remarks:

Note. Items of observations and the likert scale are adapt from (Chesterfield, 1997; Bhagwanji, 2011; PERMATA Curriculum, 2013; National Preschool Curriculum Standard, 2016).

Table 1 shows the items of observation for the use of types of approach encompassing thematic, integrated, mastery, contextual and project-based approaches.

Table 2
Items of observation for the suitability of the selection of approaches

Second Category: The suitability of the selection of approaches
The criteria of selection with the lessons/activities planned.

- Relevance
- Parallel
- Engaging

4	3	2	1
---	---	---	---

Educators integrate more than 2 criteria from the teaching approach.	Educators integrate 2 criteria from the teaching approach.	Educators integrate 1 criterion from the teaching approach.	Educators not integrating any criteria from the teaching approach.
--	--	---	--

Remarks:

Note. Items of observations and the likert scale are adapt from (Chesterfield, 1997; Bhagwanji, 2011; PERMATA Curriculum, 2013; National Preschool Curriculum Standard, 2016).

Table 2 shows the suitability of the selection of approach covering relevance, paralellism and engagement.

Table 3
Items of observation for meaningful teaching

Third category: Meaningful teaching			
The criteria of the approach used successfully make the teaching/activity meaningful for the children.			
<ul style="list-style-type: none"> - Interaction/discussion - Stimulation - Involvement - Curiosity - Questions and answers 			
4	3	2	1

Educators integrate more than 2 criteria from the meaningful teaching approach.	Educators integrate 2 criteria from the meaningful teaching approach.	Educators integrate 1 criterion from the meaningful teaching approach.	Educators not using any criteria.
---	---	--	-----------------------------------

Remarks:

Note. Items of observations and the likert scale are adapt from (Chesterfield, 1997; Bhagwanji, 2011; PERMATA Curriculum, 2013; National Preschool Curriculum Standard, 2016).

Table 3 shows meaningful teaching covering interactions/discussions, stimulation, involvement, curiosity and questions and answers.

Table 4
Items of observation for science process skills activities

Fourth Category: Science process skills activities
Activities containing science process skills

- Problem solving
- Finding reasons
- Looking into the process
- analytical
- inquiry
- reflection

4	3	2	1
Educators deliver more than 2 science process activities.	Educators deliver science process activities.	Educators deliver 2 science process skills activity.	Educators deliver 1 science process skills activity.
			Educators not delivering any science process skills activities.

Remarks:

Note. Items of observations and the likert scale are adapt from (Chesterfield, 1997; Bhagwanji, 2011; PERMATA Curriculum, 2013; National Preschool Curriculum Standard, 2016).

Table 4 shows children’s science skills activities covering problem-solving, finding reasons, looking into the process, analytical, inquiry and reflection.

Conclusion

It is hoped that through the construction of the items of observation, the instrument observation in the selection of meaningful approach can be generated to assess children’s science process skills. Last but not least, educator’s teaching strategies get to be diversified to achieve the teaching and learning objectives.

Acknowledgement

This part of the research “Development of a Comprehensive and Integrated Model of Quality Malaysian Early Childhood Care and Education-Project 3/TLA: Determining Contributing Factors of Quality ECCE” (2015-0024-106-04-3) is funded by Ministry of Finance through Ministry of Education Malaysia. Special appreciation is also attended to National Child Development Research Centre Universiti Pendidikan Sultan Idris, Malaysia for giving us the opportunity to carry out this research project.

Corresponding Author

Associate Professor Dr. Nordin Mamat
Department of Early Childhood Education
Universiti Pendidikan Sultan Idris
Perak, Malaysia
E-mail: nordin@fppm.upsi.edu.my

References

- Al-Hooli, A. A. (2001). Science and children’s literature: Preschool teacher’s attitudes and pedagogical content knowledge. Dissertation. University of Virginia.
- Bahagian Pendidikan Awal Kanak-kanak. (2013). Kurikulum PERMATA Negara. Cyberjaya, Selangor: Prime Minister Office Malaysia.
- Bhagwanji, Y. (2011). *Early childhood environmental education rating. United States: The North American Association for Environment Education.*
- Bonner, D. P. (2012). The impact of formative assessment on student learning and teacher instruction. Dissertation. Jones International University.
- Chesterfield, R. (1997). *Classroom observation tools. United States: Agency for International Development Bureau for Economic Growth, Agriculture and Trade Office for Education.*
- Elfrink, T. R., Goldberg, J.M., Karlein, M.G., Bohlmeijer, E.T. & Clarke, A.M. (2017). Positive educative programme: A whole school approach to supporting children’s well-being and creating a positive school climate: a pilot study. *Health Education*, 117.2, 215-230.
- Gloria, G.S. (2008). *Teaching approaches and strategies.* Philippines: KATHA Publishing Co. Inc.
- Kaplan, S. (2016). Pedagogy for early childhood gifted education. *Gifted Child Today*, July 2016, 134-139.
- Kementerian Pendidikan Malaysia. (2016). Kurikulum Standard Prasekolah Kebangsaan. Putrajaya: Ministry of Education Malaysia.
- Loy, C. L. (2017). *Modul kursus pengajaran dan pembelajaran dalam pendidikan awal kanak-kanak.* Tanjung Malim: Universiti Pendidikan Sultan Idris Holding Sdn. Bhd.
- Roy, K. (2006). *Effective teaching strategies: Lessons from research and practice.* Australia: Thom Social Science Press.
- Vartuli, S., Snider, K. & Holley, M. (2016). Making it real: A practice based early childhood teacher education program. *Early Childhood Education Journal*, 5