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The Development of Preschool Nature Education Module (PreNEM) for Preschool Teachers Based on Higher Order Thinking Skills.

Abdul Halim Masnan, Hafizul Fahri Hanafi, Azizah Zain, Farah Shafawati Mohd-Taib

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Abstract The purpose of this study was to develop the Preschool Nature Education Module (PreNEM) based on Higher Order Thinking Skills (HOTS) as a professional exercise and guide for preschool teachers to undertake teaching and learning related to the environment. The process of developing the module involved three phases, which were the phase of needs analysis of the module elements, the module development phase, and the module implementation and evaluation phase. The developed module encompassed based on HOTS in the Malaysian Nature Education in Preschool (MyNEPs). Program in the components of weather, flora, fauna, insects and microbes for children to face the environment, environmental care and independence of life. This qualitative study involved four excellent preschool teachers who had at least 10 years of teaching experience as well as the quantitative study involved 29 children from four preschools in Selangor state, Malaysia. The research found that preschool teachers had great knowledge on preschool nature education, however, they lacked the skills and attitudes to implement teaching and learning based on HOTS. The teaching and learning implementation results using the PreNEM based on HOTS helped to increase the teaching skills of preschool teachers and increase knowledge, skills and the attitudes of children towards the MyNEPs program.

Keywords: preschool teacher, nature education, module development, children and higher order thinking skills.

Abstrak Tujuan dari penelitian ini adalah untuk mengembangkan Modul Pendidikan Alam Prasekolah (PreNEM) berdasarkan Keterampilan Berpikir Tingkat Tinggi (HOTS) sebagai latihan profesional dan panduan bagi guru-guru prasekolah untuk melakukan pengajaran dan pembelajaran yang berkaitan dengan lingkungan. Proses pengembangan modul melibatkan tiga fase, yaitu fase analisis kebutuhan elemen-elemen modul, fase pengembangan modul, dan fase implementasi dan evaluasi modul. Modul yang dikembangkan mencakup berdasarkan HOTS dalam Pendidikan Alam Malaysia di Prasekolah (MyNEPs). Program dalam komponen cuaca, flora, fauna, serangga dan mikroba untuk anak-anak menghadapi lingkungan, kepedulian lingkungan dan kemandirian hidup. Penelitian kualitatif ini melibatkan empat guru prasekolah hebat yang memiliki pengalaman mengajar minimal 10 tahun serta studi kuantitatif melibatkan 29 anak-anak dari empat prasekolah di negara bagian Selangor, Malaysia. Penelitian ini menemukan bahwa guru prasekolah memiliki pengetahuan besar tentang pendidikan alam prasekolah, namun, mereka tidak memiliki keterampilan dan sikap untuk menerapkan pengajaran dan pembelajaran berdasarkan HOTS. Hasil implementasi pengajaran dan pembelajaran menggunakan PreNEM berdasarkan HOTS membantu meningkatkan keterampilan mengajar guru prasekolah dan meningkatkan pengetahuan, keterampilan, dan sikap anak-anak terhadap program MyNEPs.

Kata kunci: guru prasekolah, pendidikan alam, pengembangan modul, anak-anak dan keterampilan berpikir tingkat tinggi

Abdul Halim Masnan, Hafizul Fahri Hanafi, Azizah Zain, Farah Shafawati Mohd-Taib
Universiti Pendidikan Sultan Idris and Universiti Kebangsaan Malaysia
abdul.halim@fpm.upsi.edu.my, hafizul@fskik.upsi.edu.my, azizah.zain@fpm.upsi.edu.my, farah_sh@ukm.edu.my

Introduction

The National Education Philosophy (NEP) characterized education in Malaysia as a continuous effort towards expanding individual potential in a holistic and integrated manner to develop individuals who are balanced intellectually, spiritually, emotionally and physically based on the belief and compliance to God (Education Act 1996). Referring to the Malaysian Education Blueprint (MEB), 2013-2025, the transformation of education was created to prepare children to face the challenges of the 21st century in which they no longer only need to master the basic skills of reading, writing and counting after finishing school. Rather, they require thinking skills that are more critical, creative and innovative to be continuously competitive and relevant.

Thus, the emphasis on Higher Order Thinking Skills (HOTS) is strengthened through MEB 2013-2025 through requiring each student to empower cognitive skills such as creative and innovative thinking, problem-solving and reasoning, and learning ability (Ministry of Education, 2013). Thus, the National Preschool Curriculum Standard Malaysia (NPCS) 2010 that was specific for preschool education was revised in 2017 to include elements of HOTS to meet current demands (Ministry of Education, 2017).

According to Birbili (2013), HOTS encompasses the ability to use knowledge, skills and added value in reasoning and evaluation to solve problems, innovate and create. The implementation of HOTS is the main factor behind Malaysia recording an increased score in the Program for International Student Assessment (PISA) 2015 in the domains of scientific literacy, reading literacy and mathematical literacy (Bernama, 2016). Thus, the implementation of HOTS in Science, Technology, Engineering and Mathematics (STEM) is considered more efficient through Environmental Studies. This is because Environmental Studies helps the future generation to control life and prosper in the future (Oltman, 2012; Perikleous, 2004).

Even though education transformation has been implemented by the government, the practice of encouraging HOTS among children in teaching and learning still has gaps in its execution. Mohammad Sani (2007) found that the challenges faced by teachers in Malaysia are in terms of determining the goal of learning and the method to prepare effective developmental activities for children. Thus, the shortage of materials that contain learning resources specifically to integrate elements of HOTS results in a need for commitment and ability to be guided by modules to implement hands-on activities.

Metode

The main objective of this study was to develop the Preschool Nature Education Module (PreNEM) based on HOTS as a teaching and learning guide for preschool teachers. The developed module encompassed knowledge, atitudes and skills in the Malaysian Nature Education in Preschool (MyNEPs) Program in the components of weather, flora, fauna, insects and microbes for children to face the environment, environmental care and independence of life.

This qualitative study analysis involved four excellent Preschool Teachers (PT1, PT2, PT3 and PT4) who had experience of at least 10 years and above. The sample was chosen using purposive random sampling, which was by looking at the education background, years of service, excellence recognition, and preschool education option based on NEP and NPCS from Selangor. An interview was conducted among the preschool teachers who conducted the teaching and learning activity in the classroom. Observation was also conducted to evaluate the implementation of the module using a teaching and learning observation form based on NPCS. Observation and document analysis were also conducted to determine the three elements of knowledge, skills and attitudes of the teachers in using the model, and subsequently to review the interest.

This qualitative study through descriptive analysis involved 29 children (6-year-old) tendency of the children towards the Malaysian Nature Education in Preschool (MyNEPs) Program. The children have been selected from Preschool 1, Preschool 2, Preschool 3 and Preschool 4 in Selangor State, Peninsular Malaysia as participants.

The Preschool Nature Education Module (PreNEM) development process involves three phases namely the phase of elements preschool nature education analysis, module development phase and module evaluation and implementation.

Phase 1

The element preschool nature education analysis phase using the HOTS model and literature review for the initial formation of this module. The interview method for four excellent preschool teachers was also used to determine the specification of these HOTS - based Malaysian Nature Education in Preschool (MyNEPs)

Phase 2

The module development phase involves the provision of materials, expert review and validity of the module content. The module is then revised and refined by four experts and experienced preschool teachers.

Phase 3

The implementation and evaluation the Preschool Nature Education Module (PreNEM) involves the usability test of the HOTS-based Malaysian Nature Education in Preschool (MyNEPs) Program in four preschools.

Result and Analysis

The results were analysed based on the main objective of the study. The required elements which were knowledge, attitudes and skills using the HOTS model were obtained from the interview and observation of the four PT as a guide for the Preschool Nature Education Module (PreNEM) development.

Knowledge

PT1 stated that MOE had prepared a nature education module and guideline that is standardised throughout Malaysia that helped him implement HOTS. PT2 said that the State Education Department (SED) played an important role such as providing workshops for HOTS implementation at the preschool level. PT3, however, said that teachers should not be burdened with the implementation of HOTS, and that they need knowledge, skills and a positive attitude to manage teaching and learning based on HOTS. PT4 stressed that each teacher must have documenting skills such as journaling or daily note-taking on children regarding the HOTS activities.

Attitudes

PT1 stated that teachers need to consider the cognitive level of children before planning teaching and learning. PT2 suggested that teachers should encourage children to ask high-level questions in an activity. PT3 said that the teaching and learning approach that encourages HOTS in children include problem-solving, projects and inquiries. PT4 shared teaching and learning materials that encourage HOTS in children in the classroom such as time-lapse videos.

Skills

PT1 stated that teaching and learning linked to HOTS is difficult to implement without exploration and investigative activities. PT2 found that materials and resources help save teachers' time. PT3 stressed on the teacher's confidence as a success factor behind the implementation of teaching and learning based on HOTS. PT4 emphasised on the need for a support system as a guide to implement teaching and learning based on HOTS in the classroom.

The quantitative study to evaluate the applicability of the Preschool Nature Education Module (PreNEM) involving 29 children from four preschools in Selangor

showed an increase in terms of knowledge, skills and attitudes of the children towards the Malaysian Nature Education in Preschool (MyNEPs) program.

Data Analysis of Preschool 1.

Based on document analysis in Table 1 that has been done, pre-test achievement was 32.75 while the mean of post-test achievement was 36.13.

Table 1. Document analysis pre-test and post-test

No.	Group	Mean	N	Std. Deviation	Std. Error Mean
1	Pre-test	32.75	8	6.475	2.2.89
2	Post-test	36.13	8	4.581	1.619

Sig value $p = 0.019 < 0.05$ in Table 2 showed that there was a significant difference between children after undergoing the MyNEPS Program.

Table 2. Significant value

Group	Mean	Std. Deviation	Std. Error Mean	Sig value	Result
Pre-test	- 3.375	3.159	1.117	.019	Significant
Post-test					

Data Analysis of Preschool 2

Based on document analysis that has been done, pre-test achievement was 35.86 while the mean of post-test achievement was 35.29.

Table 3. Document analysis pre-test and post-test

No.	Group	Mean	N	Std. Deviation	Std. Error Mean
1	Pre-test	35.86	7	2.854	1.079
2	Post-test	35.29	7	4.192	1.584

Sig value $p = 0.785 < 0.05$ showed that there was a no significant difference between children after undergoing the MyNEPS Intervention Program.

Table 4. Significant value

Group	Mean	Std. Deviation	Std. Error Mean	Sig value	Result
Pre-test	.571	5.287	1.998	.785	No Significant
Post-test					

Data Analysis of Preschool 3

Base on document analysis that has been done, pre-test achievement was 31.50 while the mean of post-test achievement was 35.67.

Table 5. Document analysis pre-test and post-test

No.	Group	Mean	N	Std. Deviation	Std. Error Mean
1	Pre-test	31.50	6	3.782	1.544
2	Post-test	35.67	6	1.506	.615

Sig value $p = 0.036 < 0.05$ showed that there was a significant difference between children after undergoing the MyNEPS Intervention Program.

Table 6. Significant value

Group	Mean	Std. Deviation	Std. Error Mean	Sig value	Result
Pre-test	- 4.167	3.601	1.470	.036	Significant
Post-test					

Data Analysis of Preschool 4

Base on document analysis that has been done, pre-test achievement was 34.00 while the mean of post-test achievement was 36.38.

Table 7. Document analysis pre-test and post-test

No.	Group	Mean	N	Std. Deviation	Std. Error Mean
1	Pre-test	34.00	8	2.619	.926
2	Post-test	36.38	8	2.925	1.034

Sig value $p = 0.115 > 0.05$ showed that there was no significant difference between children after undergoing the MyNEPS Intervention Program.

Table 8. Significant value

Group	Mean	Std. Deviation	Std. Error Mean	Sig value	Result
Pre-test	- 2.375	3.739	1.322	.115	No significant
Post-test					

Data Analysis of Pre and Post MyNEPS Program Test.

Base on document analysis that has been done, pre-test achievement was 33.59 while the mean of post-test achievement was 35.90.

Table 9. Document analysis pre-test and post-test

No.	Group	Mean	N	Std. Deviation	Std. Error Mean
1	Pre-test	33.59	29	4.355	.809
2	Post-test	35.90	29	3.426	.636

Sig value $p = 0.006 < 0.05$ showed that there was a significant difference between children after undergoing the MyNEPS Intervention Program.

Table 10. Significant value

Group	Mean	Std. Deviation	Std. Error Mean	Sig value	Result
Pre-test	-2.310	4.176	.775	.006	Significant
Post-test					

Based on the t-test, there was an increase from the pre-test to the post-test. Analysis showed that there was a significant difference in Preschool 1 in which $p = 0.019 < 0.05$, and Preschool 3 at $p = 0.036 < 0.05$. However, there was no difference in Preschool 2 at $p = 0.785 > 0.05$, and Preschool 4 was $p = 0.115 > 0.05$. Overall, the children who followed the Malaysian Nature Education in Preschool (MyNEPs) Program showed a significant difference at $p = 0.006 < 0.05$.

Discussion

The findings show that preschool teachers have a high level of knowledge about HOTS but paucity of skills and attitudes in implementing HOTS -based learning on preschool nature education. However, this preschool nature education proves that it is effective in improving teachers' pedagogical skills. The findings also found that preschool teachers capable of conducting teaching and learning using the preschool nature education based on HOTS effectively.

The findings of document analysis and observations also shows HOTS is effective in the learning process thus improved preschool children's knowledge, skills and their attitudes towards Malaysian Nature Education in Preschool (MyNEPs). It also shows that the techniques and activities in this Preschool Nature Education Module (PreNEM) help them in learning and understanding about nature education.

In addition, the activities included in the module are indeed helpful and effective to give preschool children a better understanding and memorization of things in a simpler, easier and more practical way. Besides, it will also facilitate preschool children to revise the lessons and so on. This clearly demonstrates that these interventions have shown positive outcomes for preschool children in Selangor State preschools.

This development of the the Preschool Nature Education Module (PreNEM) based on HOTS is forecasted to provide guidance, exercise and deeper understanding regarding the use of activities connected to HOTS as well as increase awareness to the environment. In a study by Zakiah (2014), it was proven that the development of a learning module through playing in preschools had successfully created a learning environment that was planned and systematic, which consequently increased the motivation and understanding of teaching and learning concepts among children.

Conclusion

Based on the results of the analysis, it is clear that this Preschool Nature Education Module (PreNEM) gives a positive effect towards the teachers' teaching and learning and helped increase the knowledge, skills and attitudes based on HOTS of the children towards the Malaysian Nature Education in Preschool (MyNEPs). By achieving the objective, this study was able to help the researcher develop the Preschool Nature Education Module (PreNEM) based on HOTS suitable with the level of preschool children.

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