

Research on Factors of Fun Activities Affecting the Sustainable Environmental Behaviour of Preschoolers (From 3 to 6 Years Old)

TRAN THI KIM YEN, NGUYEN THANH HUYEN, NGUYEN VIET HIEN, DANG VAN PHUC
University of Education Vietnam National University,
144 Xuan Thuy Street, Cau Giay, Hanoi,
VIETNAM

Abstract: - Fun activities are the main activities of preschoolers; they are also a path, method, and means of conducting comprehensive education for preschoolers (from 3 to 6 years old), including education on sustainable environmental behaviour. This research aims to point out the factors of fun activities that affect and influence the formation and development of sustainable environmental behaviour of preschoolers. The author, in this research, surveyed 300 preschool teachers in Hanoi and directly observed 156 preschoolers in 11 preschools in Hanoi to collect data and used exploratory factor analysis (EFA) to analyse the data. The research found that there are 3 factors of fun activities that affect the awareness, attitude, and sustainable environmental behaviour of preschoolers, including: Contents of fun activities related to environmental education and environmental protection, Rules of the game on environmental education and environmental protection, and Specific actions on environmental education and environmental protection. The research also pointed out the fundamentals of sustainable environmental behaviour, which are environmental awareness, attitude towards the environment, and environmental protection acts. The research findings are expected to provide the basis and reference for further research on the impacts of fun activities on the formation and development of sustainable environmental behaviour of children aged 3 to 6. Thereby, the author recommends that preschools should design and build in the direction of integrating fun activities related to environmental education and environmental protection with other educational contents and activities in preschools; and simultaneously guide preschoolers to understand the specific regulations when participating in fun activities related to environmental education and innovative methods to organise and implement fun activities related to environmental education in the direction of allowing children to directly experience and perform environmental protection behaviours.

Key-words:- Fun activities; sustainable environmental behaviour; preschoolers; early childhood education; target of skills-behaviours; target of attitude-sentiment.

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1 Introduction

In recent years, education on sustainable environmental behaviour has been discussed in many different fields of social life, including educational science. Education on sustainable environmental behaviour has been recognized as a target and goal of various educational activities. Several educational scientists believe that it is required to conduct education on sustainable environmental behaviour from an early age, especially the preschool age from three to six years old on a regular and continuous basis and in association with environmental protection practices. This comprehensively affects the awareness, attitude, and behaviour of preschoolers. At the preschool age, fun activities are chosen as the best and most effective means and way to conduct education on sustainable environmental

behaviour for preschoolers by educators and preschool teachers. The regular, continuous, and comprehensive impacts of fun activities related to environmental education on new awareness, attitudes, and behaviours can form sustainable environmental behaviours in preschoolers.

2 Theory of Fun Activities

Fun activities are particularly important for preschool children aged from three to six. These activities related to education on awareness and behaviour to protect the surrounding environment are believed to help them develop social skills. Through plays, children will learn how to communicate, share and support each other and improve their awareness in the process of exploring the world around them, [6]. In fact, the relationship between adults and children is disproportionate, as

adults hold most of the power, knowledge, and expertise, making it impossible for children to request adult contributions. In peer interactions, children will have a more balanced relationship, so it is easier for them to challenge mutual contributions during play. This is only possible in fun activities. Fun activities are a favourable opportunity for children to demonstrate their positive environmental behaviour. It is in the process of playing where children can easily acquire a number of socio-cultural experiences, which are a form of life organisation and means to form children's society and give rise to their friendship. Fun activities are exceptionally important in the life of children. The way children perform in their fun activities may later be reflected in their performance at work. Thus, it is the skills that children are trained through fun activities that influence the formation of their future working skills, [5].

According to educators, [1], play is the work of a child. In the Montessori education method, children's playtime is the time when children learn and imagine. Plays, through different ways, reproduce activities performed in everyday life. Children use their own ways to experience life, hence, teachers should cooperate to help them learn and develop.

In children's playing process, it is necessary to help them understand and follow the principles and rules of the game, and also reinvent the principles and rules of the game and situations that reflect the children's own socio-cultural world, where they learn to make social principles, strongly cooperate with others, and promote appropriate social behaviour, [4].

In games, especially thematic role-playing games, a children's society is formed naturally. The games have the ability to "stick" children together and create opportunities to practice sustainable environmental behaviours. While working together, children should know how to cooperate with each other, [4]. Play is the main activity of preschoolers, and the balanced and flexible role change in games provide the basis and foundation for the development of children in line with the future situation and circumstances, [2]. Symbolic function is an essential play behaviour of thematic role-play games. Such symbolic elements are usually role playing and manipulating that role. Symbolic behaviour in children's thematic role-play games includes such elements as (1) one object as a symbol to represent another, (2) a symbolic act with the substitute, (3) the act of impersonating someone else (or pretending to be someone else),

and (4) the ability to play situations or imaginary play situations, [3].

3 Theory of Sustainable Environmental Behaviour Education

According to [7], environmental education for people in general, and children in particular, plays a very important role in providing solutions to protect the environment and create sustainable development for human society, [7]. In their research, the authors introduced the concept of "sustainable environment behaviours" which are roughly regarded as sustainable environmental behaviours. He interpreted the positive correlation among the concepts: environmental awareness, environmental skills, and attitude towards the environment, [7]. The results of scientific surveys and experiments revealed that education on sustainable environmental behaviours is a global issue, not the sole responsibility of each individual, organisation, or country.

Although the concern about the environment has never been so profound in developing countries, this practice may not be translated into environmentally responsible behaviour. One of the possible reasons for the gap between attitudes and behaviours is a general concern for the living environment with a sense of hopelessness and an inability to turn such concern into action. Environmental education may play a core role in the solution of this issue if it empowers people to adopt a "sustainable" behaviour and to make decisions that benefit the environment, [7]. However, no clear explanation has been given for the gap between possessing environmental knowledge and environmental awareness and the manifestation of environmental protection behaviours, [9].

There is a positive relation or positive correlation between environmental knowledge and students' attitudes towards the environment. As shown by the authors, students majoring in the environmental field obtain more understanding and environmental attitudes in comparison with students of other majors. The authors discussed the relation among knowledge, attitudes and behaviour, and the influence of fundamental factors on students' ability to understand the environment. Attitude is one of the most important, but controversial, factors influencing one's behaviours. There is a relatively high positive correlation between students' environmental attitudes and the overall behavioural environment, and students'

limited ability to practice environmentally responsible behaviour, [13]. Environmental knowledge is the foundation of attitudes and behaviours toward environmental sustainability, [14].

4 Theory of the Impact of Fun Activities on Sustainable Environmental Behaviour Education

The practice of early childhood education shows that the three factors (environmental awareness, attitude towards the environment, and behaviour towards the environment) are correlated with each other, but the degree of correlation will be varied. The environmental attitudes and responsible environmental behaviours of preschool teachers have a low correlation, while the responsible environmental behaviour and scientific attitude have a significant correlation, [8].

Over the past three decades, human behaviours have become alarmingly energetic toward environmental sustainability. One of the most influential environmental initiatives to protect and raise environmental awareness (including perceptions, attitudes, and behaviours) is the solid strengthening of preschools, primary, and secondary schools about environmental education. To be more specific, the content of environmental behaviour education should be conducted from the lowest and first level of education - preschool. Environmental behaviour education must be conducted regularly, continuously, and persistently to form sustainable environmental behaviours in preschoolers and students. Environmental education can play a decisive role, allowing preschoolers to develop sustainability-conscious behaviour and make decisions in favour of environmental sustainability. Preschoolers are important contributors to the development of environmental awareness and the promotion of environmentally responsible behaviours, [12].

Environmental education at preschools targets knowledge, skills-behaviours, and attitude-sentiment. Fun activities have many favourable conditions in environmental education for preschoolers because they are the main activity of this age group, have strong emotional impacts, and are suitable for age-psychological characteristics. There are several sustainable environmental behaviour education solutions to be implemented including (1) making environmentally themed play plans, (2) collecting familiar games related to the environment, (3) building an environment and rules of games related to environmental education, (4) creating problematic play situations related to environmental themes, (5) rotating roles and switching members among groups, with emulation-reward while playing, and (5) monitoring and moulding children play in conformity with the rules and environmental themes, [5].

Thus, fun activities, especially thematic role-play games, play an important role as a path and effective means of forming children's personality as well as effective means of forming sustainable environmental behaviours. However, there are few studies that specifically address the development of sustainable environmental behaviour through fun activities. The education on sustainable environmental behaviours for preschoolers should be done through children's educational activities at any time of fun activities.

5 Description of the Research Sample and Research Methods

In this research, the author used a mixture of different research methods. However, Exploratory Factor Analysis (EFA) was the key method through surveying and investigating 300 preschool teachers in Hanoi and directly observing 156 preschoolers in 11 preschools in Hanoi. The details of the teachers attending the research were presented in the Table 1. Similarly, a presentation of a suitable environmental behavior is depicted in Figure 1.

Table 1. Gender of teachers participating in the research

Gender	Quantity	Ratio
Male	0	0
Female	300	100
Total	300	100.0

Table 2. Training qualifications of teachers participating in the research

Training qualifications	Quantity	Ratio
Intermediate	48	16.0
College	56	18.7
Undergraduate	159	52
Graduate	37	12.3
Total	300	100.0

Table 3. Gender of preschoolers participating in the survey

Gender	Quantity	Ratio
Male	75	48.1
Female	81	51.9
Total	156	100.0

Table 4. Distribution of preschools participating in the research

Districts	Quantity	Ratio
Nam Tu Liem	5 schools	45.4
Bac Tu Liem	2 schools	18.2
Hoan Kiem	2 schools	18.2
Cau Giay	2 schools	18.2
Total	11 schools	100.0

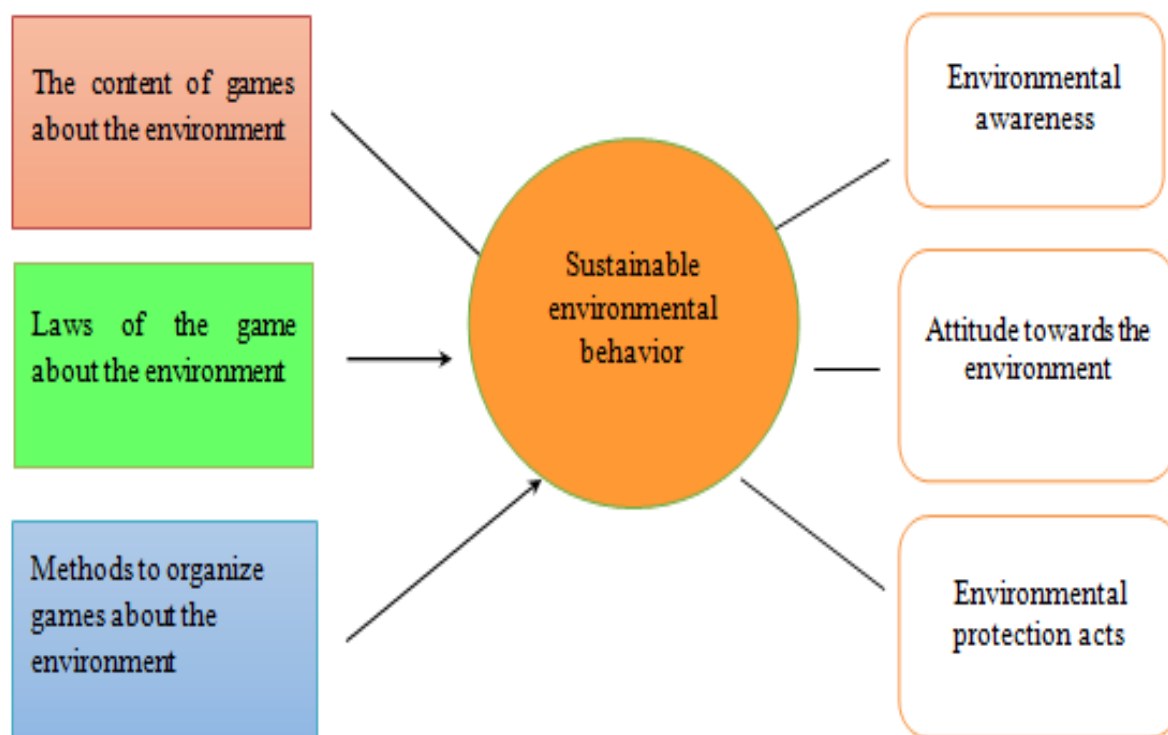


Fig. 1: Presentation of a suitable environmental behavior

As shown in the Table 1, among 300 preschool teachers participating in the research, 300/300 teachers (accounting for 100%) are female and there are no male teachers. This is a typical feature of Vietnam's early childhood education, where child rearing and care are rarely reserved for men.

Table 2 indicates that the majority of preschool teachers participating in the research holding undergraduate degrees were 159/300 attendants (accounting for 52%). The remaining preschool teachers obtained intermediate, college, and graduate degrees. The number of preschool teachers with graduate qualifications was the lowest in the sample with 37/300 individuals (accounting for 12.3%).

Table 3 showed that among the children participating in the survey, the majority of children were girls with the number of 81/156 children (accounting for 51.9%). However, this difference is not large, only 3.8% compared to boys.

Table 4 showed that Nam Tu Liem district has the largest number of preschools participating in the research with 5/11 schools (accounting for 45.4%). The remaining districts (Bac Tu Liem, Hoan Kiem, and Cau Giay) had the same number of preschools participating in the research with two schools each (accounting for 18.2% each).

The research team provided an overview of several research projects on sustainable environmental behaviour education through fun activities and identified the inherited contents as well as building the research model as follows:

From the research model, the authors designed questionnaires and administered a survey to 300 preschool teachers. The questionnaire included personal information, an open question system (including eight questions), and 30 closed questions with a 5-degree Likert scale. The obtained results were then cleaned and put into SPSS version 25.0. The interpretation of reference sources and coding of variables are shown in the following table:

Table 5. Interpretation of Reference Sources and Coding of Variables

No.	Content of variables and reference sources	Coding of variables
Independent variable: Fun activities		
1	Topics related to environmental education, [1], [5], [8], [9]	CDMT1-3
2	Children's dialogue related to the environment, [5], [7], [14]	LTMT1-2
3	Other games related to the environment, [3], [5]	TCK1-2
4	Rules of the Game, [5], [10]	QDLC1-3
5	In-game rewards/punishments, [3], [5]	TPTC1-2
6	Children experience environmental protection simulation, [1], [5], [14]	TNMT1-3
7	Children proactively, actively and creatively participate in games, [1], [3], [5]	CDTCST1-4
8	Children are encouraged and inspired to participate, [1], [3], [5]	DVKL1-2
Number of variables: 21		
Dependent variable: Sustainable environmental behaviour		
9	Environmental awareness, [11], [12], [13]	NTMT1-3
10	Attitudes towards the environment, [11], [12], [13]	TĐMT1-3
11	Environmental protection acts, [11], [12], [13]	HĐMT1-3
Number of variables: 09		
Total: 30 variables		

Table 6. Cronbach's alpha analysis results

No.	Factors	Number of observed variables	Cronbach's Alpha	Corrected Item - Total Correlation
1	Content of environmental games	7	0.734	0.360-0.616
2	Rules of environmental games	5	0.907	0.444-0.767
3	Methods to organise environmental games	9	0.958	0.827-0.877
4	Sustainable environmental behaviour	9	0.918	0.457-0.802

(Source: SPSS version 25.0)

The authors assessed the quality of the scale for the researched variables. The results showed that the Cronbach's alpha of the factors ranged from 0.734 - 0.958,

and the corrected item-total correlation ranged from 0.360 - 0.877. If the variable types were no bigger than Cronbach's alpha, it meant that the scale has high reliability.

As the scales had high reliability, the authors used the obtained results to conduct EFA to identify the factors of the independent variables and the dependent variables in the research model.

For the sample size of 300, the factor loading was more than 0.4. The EFA results for the independent variables of the rotated component matrix showed that the factor loading was all greater than 0.4, and there were three groups of factors which are the content of environmental games, rules of environmental games, and methods to organise environmental games.

Table 7. Exploratory Factor Analysis (EFA)

Rotated Component Matrix ^a				
Variables	Component			
	1	2	3	
CDMT1	.912			
CDMT2	.897			
CDMT3	.890			
LTMT1	.867			
LTMT2	.853			
TCK1	.851			
TCK2	.825			
QDLC3		.762		
QDLC1		.752		
QDLC2		.750		
TPTC2		.725		
TPTC1		.698		
TNMT1			.836	
TNMT3			.823	
TNMT2			.799	
CDTCST2			.763	
CDTCST1			.566	
CDTCST4			.821	
CDTCST3			.804	
DVKL1			.783	
DVKL2			.779	
CDTCST2			.766	
Eigenvalues	22.705	22.705	22.705	
Total variance explained	17.525	34.283	49.403	74.897
KMO parameter: .964				
Barlett test: Chi-Square: 8164.519 Df: 741 Sig: .000				
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalisation.				
a. Rotation converged in 6 iterations.				

(Source: SPSS version 25.0)

The results of the rotated component matrix for the dependent variables showed that all of the 21 observed variables which were grouped by factors had a Factor Loading of more than 0.4. The authors used Exploratory Factor Analysis (EFA) to identify the three factors affecting the sustainable environmental behaviour of preschoolers belonging to independent variables. The factors were as follows.

Factor 1 – Content of environmental games: The theme of preschoolers' play and their dialogue in the play must be related to environmental education; other games (learning, movement) are integrated and related to the environment.

Factor 2 – “Rules of environmental games”: Preschool teachers should clarify the rules of the game to preschoolers and establish a reward/punishment scheme in the game for children to follow.

Factor 3 – “Methods to organise environmental games”: Preschoolers must experience the environmental protection simulation and be proactively and creatively involved in the game; they are encouraged and inspired to participate in environmental games.

These three factors constituted the independent variables in the research model. First, fun activities were organised towards educating preschoolers on sustainable environmental behaviours. This meant that preschools should design and organise fun activities with the view to educating preschoolers on sustainable environmental behaviours. It is the most effective way and means to form sustainable environmental behaviours for preschoolers. It is required to create many opportunities for preschoolers to work together, to realise the role and meaning of sustainable environmental behaviours in people's lives, to jointly take responsibility and fulfill environmental education tasks and ensure environmental friendliness, from simple to complex actions given by preschool teachers.

Table 7 illustrated the EFA testing results of the three factors in sustainable environmental behaviour. Initially, as presented in the table, the KMO coefficient was 0.964 (which was within the range from 0.5 to 1.0); the Barlett's test value was below 0.05; the Factor Loading coefficient was above 0.5; and the Eigenvalues of all three factors were more than 1.0. These figures indicated the convergence of the factors, which indicate that the findings from factor analysis with the data set in the research were acceptable. Secondly, as the total variance explained was 74.897%, well above 50%, the factor analysis model was proved to be suitable.

This also showed that the three above factors were capable of explaining the variation of the data of 74.897%. In general, the rotation matrix results of the scales in Table 2 presented 30 observed variables classified into different independent factor groups: Content of environmental games, Rules of environmental games, and Methods to organise environmental games. In this research, no item was eliminated as none of them existed in two factor groups or shifted to another factor group, and all of the figures were greater than 0.7. Other observed variables were all suitable to use in EFA.

Compared to previous studies on the same subject matter, this particular paper demonstrated three factors affecting the sustainable environmental behaviour of preschoolers. More importantly, the research also identified specific observable variables for each factor. This is meaningful and important for preschool education managers and teachers in developing the teaching curricula, principles, and techniques, which is effective in forming and shaping sustainable environmental behaviour of preschoolers. Moreover, the research indicated observable variables of the sustainable environmental behaviour of preschoolers. This provided insight into education on sustainable environmental behaviour for preschool education managers and teachers.

6 Conclusion

Sustainable environmental behaviours of preschoolers are their positive behaviours towards the surrounding environment, which include their love and respect for the environment, acts of preserving, and cleaning the environment and fiercely fighting attitude towards the destruction of the environment. On the other hand, as shown in other studies, for preschoolers, fun activities are the main activity of this age group. Therefore, it will be most convenient and effective to organise fun activities as a path, means, and tool to educate children about sustainable environmental behaviours. The behaviours are involved with comprehensive and powerful effects on preschoolers' awareness, attitudes, and behaviours. In addition, the research findings show that awareness, attitude, and behaviour are closely correlated with each other (positive correlation). Therefore, fun activities must be organised at the same time or in an integrative way to target the above three factors. Finally, in preschools, although fun activities are the main activity, there are many other activities that should also be taken into account and combined or integrated with the fun

ones to educate preschoolers about sustainable environmental behaviours.

Psychologists and educators have defined fun activities as the main ones of preschoolers because they play a decisive role in the formation and development of children's psychological functions and affect all other activities of a child. Based on such roles, many psychologists, educators, education administrators, and preschool teachers have used fun activities to carry out tasks with the view to educating preschoolers on sustainable environmental behaviours. In order to do so, it is required to identify and assess how the factors of fun activities influence preschoolers' awareness, attitude, and behaviour about the environment. Exploratory Factor Analysis (EFA) helped to identify the three factors with the above impacts, which are: Content of environmental games, Rules of environmental games, and Method to organise environmental games. Investigating these factors, the author believed that:

First, the theme of the play and dialogues used in that for preschoolers must be related to environmental education, and other games (i.e. learning or movement) are integrated and related to the environment.

Second, preschool teachers should clarify the rules of the game to preschoolers, and establish a reward/punishment scheme in the play for them to follow.

Third, Preschoolers must experience the environmental protection simulation, be proactively and creatively involved in the play; and they are encouraged and inspired to participate in environmental games.

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Contribution of Individual Authors to the Creation of a Scientific Article (Ghostwriting Policy)

The authors equally contributed in the present research, at all stages from the formulation of the problem to the final findings and solution.

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Conflict of Interest

The authors have no conflicts of interest to declare that are relevant to the content of this article.

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