# Development of Ape Smart Gifts Based on Natural Materials and Used Goods to Introduce the Symbol of Numbers

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**Abstract.** The research design employed the research and development model of Borg & Gall which includes several stages. By using this model, media expert and material expert were involved as validators to assess the feasibility of the EGT developed, while parents assessed its practicality. The data collection instruments were questionnaires and observations. While the data analysis technique is quantitative descriptive analysis. This research resulted in a product of an Educational Game Tool Kado Pintar and a Module. Media expert rated EGT Kado Pintar as “very feasible” with an average score of 4.00, while material expert rated it “fairly feasible” with an average score of 3.00. Parents gave an average score of 3.7 which means “very practical”. The results of the small group test was in the "fairly effective" criteria with a percentage of 50%. In the field test, the control group got a percentage of 33.33%, the category "fairly effective," while the experimental group got a percentage of 80% or "very effective". These results indicate that EGT Kado Pintar has a significant influence and it is "feasible, practical, and very effective," to introduce number symbols to early childhood children aged 5-6 years in Cimpar, Laci-Carep Village.

**Keywords:** ape smart gift, appropriateness, educational game tools, effectiveness, practicality

## 1 Introduction

The world of children is a world of play. Play is the most important activity carried out by children because for children, play is something that is considered equal in value to work and study for adults [1]. Play is a very meaningful experience for children because it can optimize the potentials that exist in them [2]. However, this will be achieved if it is supported by the right playing media. Such a medium is called the Educational Game Tool (APE) in Early Childhood Education. Educational game tools are all play tools that are used to meet children's play instincts and have various traits such as disassembling, grouping, blending, looking for their equivalents, stringing, forming buildings, pegging, perfecting a design or arranging according to shape, etc [3], [4]. Playing using educational game tools is important because early childhood thinks concretely. Educational game tools play a role in stimulating the development of all six aspects of early childhood development.

Today almost all early childhood educational institutions use educational game tools. Most APE is classified as a modern APE produced by a particular factory. Modern APE is generally

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expensive and its operation presupposes a certain skill set. As a result, not all ECCE Institutions can provide these gaming tools [5]. In addition, not everyone can use it for educational purposes, especially people who do not have an educational background in ECCE teachers, especially parents of students. Such a situation should not happen, if people do not understand APE only to the extent of modern tools. Thus, early childhood education institutions need to think about and create APE from simple materials that are easily obtained from the surrounding environment, especially natural materials and used goods. The natural materials and used goods are very close to the child. This makes it easier for children to remember, so that the process of Study becomes more and more enjoyable. In addition, this type of APE is cheaper and easily affordable without losing its educational value.

Departing from this situation, this study intends to design an educational game tool for early childhood. By following the flow of the research design and development of the Borg & Gall model, this research aims to design an Educational Game Tool product for early childhood. Remembering that the function and types of educational game tools are very broad, this research will be limited to the development of APE natural goods used which function in developing one aspect of early childhood development, namely cognitive aspects, specifically related to the introduction of lam-bang numbers, in children aged 5-6 years. This Educational Game Tool is called Smart Gift. The name Kado Pintar wants to underline that this APE is deliberately designed to arouse curiosity in children, so it is in accordance with the characteristics of early childhood itself.

The subjects of the study were children aged 5-6 years in Cimpar Village, Laci-Carep Village, Manggarai Regency. Based on preliminary observations in November 2021, it was found that children could call the numbers 1-10 smoothly. But they have not been able to correctly show (write) the emblem of the numbers 1-10. Children also have difficulty remembering what was just taught to them. With this situation, it seems that these children are not quite ready to continue their education to the next level, even though theoretically children with this age, namely the age of 5-6 years, should be able to know the numbers 1-10 well and correctly. This situation can certainly be understood because the children in the village did not receive formal education at the ECCE institution. In addition, the parental factor is also decisive. Observation in parents points out that parents still have a limited understanding of early childhood, especially about the growth and development expected in early childhood. Parents tend to give away or buy modern game tools for their children more often, such as balls, dolls, rubber, puppets, and mobile phones.

Therefore, APE smart gifts is one of the efforts to answer these concrete needs. Through the stages of research according to the Borg & Gall model, this study intends to design a Smart Gift APE product, then test its feasible aspects, practicality, and effectiveness. The results showed that APE Kado Pintar has indeed proven to be feasible, practical and effective in helping the development of cognitive aspects of children aged 5-6 years in Cimpar, especially in an effort to get to know the number symbol. This educational game tool has been designed as neatly and practically as possible so that it can be used in early childhood learning. This makes Smart Gifts can be used easily by teachers in formal education institutions, parents, the general public, and educational practitioners in early childhood learning through a fun game.

## 2 Method

This study intends to develop an Educational Per-toy Tool product "Smart Gift" which will be used to introduce the number symbol to children aged 5-6 years in Kampung Cimpar. For that purpose, the Borg and Gall development models will be used as research designs [6]. This

development model includes 10 stages, namely: research and preliminary information collection, planning, development of the initial product format or product design, design validation, design revision, field trial, product revision, field test, final product revision and dissemination and implementation.

In this study, the developer only carried out development to the eighth stage, which is field testing. This is because the focus of this research only is to test the feasibility, practicality and effectiveness of the product. This research was conducted on June 6, 2022 until June 18, 2022. The place where this research was carried out was one of the residents' houses that was large enough to be used during product trial activities with children aged 5-6 years in Cimpar Village, Laci Carep Village, namely the house of Mr. Adeltrufid Mimu. The research subjects here are in the early childhood group that will be the target of trials on the use of Smart Gift products and who determine the effectiveness of these products. So in this study, the research subjects were children aged 5-6 years in Cimpar Village. The study subjects were 13 children who were divided into three trial groups, namely the initial trial, the control group and the experimental group. Data collection techniques use interview, obsevation, and questionnaire techniques. Meanwhile, data analysis uses descriptive data analysis of quantitative statistics. Quantitative descriptive analysis is used to determine the characteristics of the data that has been collected. This method facilitates the data analysis process as well as for the revision of APE Smart Gift products made from nature and used goods.

## 3 Results and Discussion

This section discusses the research results or research data obtained at each stage based on the Borg & Gall development model.

*3.1 Research and Preliminary Information Collection*

In the form of collecting preliminary information or preliminary data about the place and subject of the product experiment to be developed. Preliminary information is obtained through interviews with parents and preliminary observation of the child's abilities, especially in terms of recognizing the symbol of simple numbers 1-10. The initial information was carried out by interviewing 5 respondents in Cimpar Village on February 5, 2022. They are parents of children aged 5-6 years who will be the subjects of product trials. The results of parental interviews show that parents are more likely to provide modern media such as mobile phones (HP), puppets, plastic balls. and dolls to the child. To introduce the number symbol to their children, they often use cellphones. Parents very rarely use simple game tools made from nature and used goods, while there is so much natural wealth and second-hand goods in Kampung Cimpar that can be used as an easy and cheap alternative learning medium.

Observation data was obtained during the implementation of the Internship II program in Cimpar Village from October to November 2021. In the implementation of these activities, observations are made on children's abilities. Observational data is strengthened by the work of children. Observations and children's work show that children do not have a correct understanding and recognition of number symbols and have not been able to know number symbols properly and correctly. Based on the results of interviews with parents, and supported by the results of observations of child development, problems were found in the process of early childhood growth and development in Cimpar Village, especially those aged 5-6 years who will enter the elementary school level education level. These problems include: a) In teaching counting or introducing number symbols, parents tend to use smartphones, puppets, and number posters. In addition, parents rarely accompany children in playing games because the work of

parents in general is farming; b) the living environment has a variety of plants and trees that can be used by parents as material for Educational Game Tools that support children in learning; and c) cognitive development in children aged 5-6 years has not developed optimally, especially in the ability to think symbolically.

From some of the problems found, it was concluded that children in Cimpar Village need game tools that can develop aspects of development that exist in early childhood, especially aspects of cognitive development. Such game tools are supposed to be simple, inexpensive, and closer to children. But such a game tool does not yet exist even though it is needed by the child. Furthermore, a review of library sources was carried out to support the initial information obtained in the field. The literature review includes an analysis of several scientific articles in various journals that specifically talk about the manufacture of APE made from nature and used goods. In addition, several videos uploaded on Youtube related to APE made from nature and used goods became part of the study. A review of these sources helps to clarify the formulation of the objectives of the APE to be developed. In general, the purpose of APE that will be developed is to develop the six aspects of development that exist in early childhood. Within the framework of this study, the APE designed has a special purpose, namely introducing the number symbol to early childhood aged 5-6 years. The introduction of number symbols is one part of the aspects of early childhood development, namely the cognitive aspect.

Educational Game Tools are designed to be multipurpose and functional. The name of the developed APE is Smart Gift. The name of the smart gift in¬hope is in accordance with the character of children who like gifts and are full of curiosity. Curiosity and curiosity can stimulate a child's thinking ability. The name and form of APE is inspired by a gift concept that is trending in the virtual universe today. So this APE is designed as a learning medium that is very practical in its manufacture and use.

*3.2 Planning*

The results of the research and the collection of preliminary information are very important to carry out the planning stage related to the product to be developed. The planning stages are: a) Create a concept of a game tool that is developed into the form of an image. Here is a picture of the initial concept in designing an educational game tool; b) Prepare tools and materials to be used, such as natural materials and used goods. The natural ingredients used in this study were: coffee beans, banana leaves, corn husks and stalks, coconut sticks and shells. While those that include used materials are cardboard, raffia rope, plastic, plastic drink cups, bottles and bottle caps and used fabrics. Here is a picture of the tools and materials used; c) Drafting APE products to be developed. The outline of this developed product into a module book as a guidebook for the use of such media. The module also contains a description of several themes that can be used in learning to play with APE Smart Gifts. This aims to help users, especially parents, in the process of learning while playing with children; and d) Make and use two measuring instruments, namely observation sheets and questionnaire sheets. The observation sheet relates to the specific purpose of developing APE Smart Gift. Observations were made to determine the developmental status of the ability to recognize the number symbol in children aged 5-6 years. The type of observation carried out is a check list using four scales that have been converted into the form of numbers, namely the number 1 meaning the child has not developed (BB), the number 2 means the child is starting to develop (MB), the number 3 means the child is developing according to expectations (BSH), and the number 4 means the child is developing very well (BSB). The assessment is carried out on the basis of predetermined indicators. In addition to the observation sheet, the prepared amendment is the "Questionnaire Sheet." The Questionnaire Sheet is an instrument used to get an assessment from an expert pa¬ra about the

APE Smart Gift products designed and the modules made. In the context of development research, the opinions and responses of experts are very important as a basis for making revisions to the developed product.

*3.3 Initial Product Format Development*

The development of the initial product format is carried out after designing the product in the form of drawings and preparing the tools and tiles to be used. The initial format was made in the form of an APE Smart Gift design with materials such as used cardboard, used detergent plastic, wrapping paper, colorful paper, etc. In this stage, it is also designed step by step the games that will be carried out using Smart Gifts, including: Game Who Am I, Let's Count, Clotheslines of Numbers and Tubes of Numbers.

*3.4 Validation*

The validity stage involves media experts and material experts as validators who will assess the feasibility of the form and use of Smart Gift APE as an early childhood learning medium. Data from media experts is obtained by providing assessment questionnaire sheets containing aspects of appearance, aspects of practicality, and physical aspects of the module book. The data obtained are then analyzed and used as the basis for conducting revisions of the product being developed. In phase I and phase II, media expert data was obtained using assessment questionnaires using an assessment scale of 1 to 4. Based on the number of answers or assessments, then the average score obtained is obtained. The average score obtained becomes the basis for determining the media's confidence.

In phase I, the media expert's assessment of the display aspects, practicality aspects and physical aspects of the Smart Gift APE module book made from nature and used goods developed was "not yet feasible" with an average score of 2.46. So based on the media experts' assessment of the quality of APE Smart Gift products developed in phase I is "less feasible." The data obtained from the validation of phase I by media experts who have been analyzed are then used as the basis for holding revisions of APE products and module books. After the initial product is revised, then the product developed is validated again by media experts in phase II by providing the revised product along with a scale assessment questionnaire 1 to 4.

In stage II validation, the expert gave an assessment with an average score of 4.00 which means that the developed media is included in the very feasible category. The material expert validator in this development research is a senior lecturer in the early childhood education study program at the Indonesian Catholic University of Santu Paulus Ruteng who teaches the Basic Concepts of Early Childhood Education course. He was chosen to be a material expert because of his competence in fields related to characteristics and the needs of early childhood.

In phase I, media experts reported that in terms of aspects of the content and presentation of the modules created were not yet feasible, with an average score of 2.00. The data obtained from the validation of phase I by the material experts who have been analyzed are then used as the basis for conducting material revisions on the use of smart gift APE products. After the initial product is revised, then the product developed is validated again by the material expert in phase II by providing a description of the activities and the revised module book along with an assessment questionnaire sheet with an assessment scale of 1 to 4. Material experts give an assessment with an average score of 3.00, which belongs to the category of "worthy." After obtaining the score value, the feasibility of the product is then classified into four eligibility criteria as contained in the following table.

Table 1
Criteria for assessing the feasibility of APE Smart Gift products

| Score | Criteria |
|---|---|
| 1,00 ≤ x < 1,75 | Not feasible |
| 1, 75 ≤ x < 2,50 | Not worth it |
| 2,50 ≤ x < 3,25 | Worthy |
| 3,25 ≤ x < 4,00 | Very worth it |

*3.5 Product Revisions*

Media experts of educational game tools provide five inputs for the improvement of APE Smart Gifts, namely: 1) the appearance of APE Smart Gift is as good as using wrapping paper, to make it look attractive and the cover page on the module book must use photo-type paper and need to redesign the image used on the cover page. This input is in accordance with the standardization of the selection of educational game tools [7], [8], which states that before choosing an educational game tool, teachers must first pay attention to some of the requirements for making it. These requirements include educational requirements, technical requirements and aesthetic requirements; 2) The egg racks used in the game "Who am I?" need to be given a variety of colors. This input is intended in addition to fulfilling educational requirements, namely so that children can recognize colors, also so that the APE that is being developed meets the characteristics of a good game tool that is interesting, as revealed by [9], [10]. The used fabric used in the game "Who am I?" is made neater. In designing educational game tools, it is necessary to pay attention to the suitability of size in order to give a neat impression and cause a sense of interest, this is in accordance with the aesthetic requirements in children's education journals by [11] who emphasize that beauty is important because it can motivate and attract children's attention. This input is related to the aesthetic requirement, namely the suitability of the size, which is not too big and not too small; and 4) Photos of tools and materials as well as APE Smart Gift tam-pilan on the Smart Gift APE module book need to be made brighter and pay attention to how to type in the Smart Gift APE module book.

After the initial product is revised, then the product that is developed is validated again by media experts in phase II by providing the revised product along with an assessment questionnaire. From the results of the assessment of media experts in phase II without any revisions or suggestions for improvement. Material Experts provide some important suggestions and inputs on materials related to the use of Smart Gift APE in learning activities. According to material experts, the material designed is less in accordance with a very limited number of research subjects and the type of media developed. In addition, the activities described with an assortment of themes are too many. This is not in accordance with the character of children who cannot last too long in doing play activities while learning.

*3.6 Initial Trial*

Initial trials for small groups were carried out in three per-findings, namely on July 8, 2022 (morning and evening) and July 9, 2022. In this trial, parents are involved to evaluate and give an assessment of the product being developed. Parents are given a child development observation sheet and a parent assessment questionnaire sheet for the product being developed. The results of the assessment of small group trials for each component showed that component 1, "Children can name symbols of numbers 1-10," a percentage of 50% for the BSH criterion (Good As Expected) and 25% un¬tuk criteria BSB (Already in the BSB criterion). That means for component 1 APE Smart Gift is in the category of quite effective and this su¬dah reaches the minimum criteria to be achieved. Component 2, "Children can use the number symbol to calculate" terhi¬tung percentage of 50% for the BSH criterion and 25% for the BSB (Already Developed) criterion. As stated in the first component, the assessment of achievements in

component 2 shows that APE Smart Gift has met the targeted criteria, namely Quite Effective. While un¬tuk component 3, "Children can match numbers with lam-bang numbers" the calculated percentage value is 50% for the BSB category. This percentage value indicates that for kom-ponen 3, the effectiveness of the Smart Gift APE is in the category of "quite effective" and meets the minimum target. Although the percentage of component 3 is the same as that of the first and second components, in this component the mode of child development criteria is BSB.

This result is influenced by many factors, especially because the trial implementation time is very short, only 3 trials are carried out in 2 days. The trial subjects also did not receive sufficient explanation before starting the activity. After conducting the initial trial, parents were asked to provide a response to the Smart Gift APE used. Parents are asked to rate APE based on aspects of appearance, practicality, and language. This assessment is carried out by answering the statement on the questionnaire sheet with an assessment scale of 1 to 4. After being collected and analyzed or calculated the average score, the results of the parents gave an average score of 3.7 against the developed APE. This means that the media is categorized as "very practical" to use. The practicality of the products developed in this study is classified into four practicality criteria as contained in the following table.

Table 2
Criteria for assessing the practicality of APE Smart Gift products

| Score | Criteria |
|---|---|
| $1{,}00 \leq x < 1{,}75$ | Tidak praktis |
| $1{,}75 \leq x < 2{,}50$ | Kurang praktis |
| $2{,}50 \leq x < 3{,}25$ | Praktis |
| $3{,}25 \leq x < 4{,}00$ | Sangat praktis |

*3.7 Field Trials*

The field trial was held on June 15-18, 2022, involving 9 children in Cimpar Village. Children are divided into two groups, namely the control group as a comparison group and an experimental group. The control group consisted of 4 children and the experimental group consisted of 5 children. The children in the control group learned to introduce the number symbol using another APE, namely the Number Poster. During the process, teachers and parents make observations and assessments of the development of the ability to recognize number symbols. This assessment is recorded in the observation sheet of the child's development assessment with a scale of assessment of child development achievement in general. Meanwhile, the experimental group studied using APE Kador Pintar. Observations and assessments were also carried out in the experimental group.

The results of the trials in the control group and the experimental group showed significant differences. Almost all of the components assessed in this trial showed striking differences. The experimental group obtained superior percentage values on all components. In component 1 of child achievement of 100%, for the category of BSB child development, it is concluded that APE Smart Gift is very effective. Component 2 with percentage values of 60% (BSB) and 40% (BSH). Then the category of effectiveness of APE Smart Gift is effective. Similarly, in component 3, children obtained a percentage score of 80% (BSB) with the category of very effective camping. Meanwhile, the control group only got a percentage value for each of its components, namely component 1 percentage value of 50% (BSH) with a fairly effective category; component 2 percentage value of 25% (MB) with less effective category; and component 3 of the 25% percentage value (MB) with the less effective category. For the rest, the children in the control group obtained an Undeveloped (BB) assessment. This makes it clear

that the use of Smart Gift APE has a significant or very effective influence on being able to realize the number symbol in children aged 5-6 years. That distinction is shown in the following Table 3.

Table 3
APE Product Effectiveness Assessment Criteria

| Effectiveness Criteria | Percentage |
|---|---|
| Less effective | $0 \leq x \leq 25\%$ |
| Effective enough | $25{,}1 \leq x \leq 50\%$ |
| Effective | $50{,}1 \leq x \leq 75\%$ |
| Very effective | $75{,}1 \leq x \leq 100\ \%$ |

## 3 Conclusion

This research has produced APE products made from nature and used goods and the APE Smart Gift module book made from nature and used goods to distribute the number symbol to early childhood aged 5-6 years. This development research has limitations. Those limitations include: First; Product development in this study is only to help introduce and improve the ability to recognize number symbols. In addition, the trial subjects are still on a small scale. Therefore, it is necessary to conduct further research to assess several aspects of the child's development simultaneously. Second; The instruments used are considered inappropriate and inappropriate. Third; The validators used are less than the mimimal provisions of 3 validators to compare the results of the given values. Based on the above conclusions, the researcher presents the following two suggestions: first; APE Smart Gift products made from nature and used goods can be used as a means to effectively introduce the number symbol for early childhood aged 5-6 years.

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