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AUTHORS

356 authors

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Life Skills Potential Mapping of School Students in Rural and Urban Area

Taufina

Developing The Big Questions And Bookmark Organizers (Bqbo) Strategy–Based Literacy Reading Learning Materials In The 4th Grade Of Elementary School

Taufina

Validity Analysis of the VARK (Visual, Auditory, Read-Write, and Kinesthetic) Model – Based Basic Reading and Writing Instructional Materials for the 1st Grade Students of Elementary School

Taufiq, Agus

Comprehensive Supervision Model And Professional Competences Of Prospective School Counselors

Tegeh, I Made

Identify and Analysis of Society Opinion about Read Write Arithmetic in Early Childhood Education

Teguh, I Made

Lesson Study in Blended Setting: Comparative Study on Students' Skills in Producing Educational Electronic Cinema

Tohani, Entoh

Model of Integrated Disaster Awareness Community To Community Learning Center (CLC) in Bantul and Sleman Distric

Tohani, Entoh

Model of The Social Capital Based Community Entrepreneurship Education (CCE) For Empowering Community: A Initial Theoretical

Trihantoyo, Syunu

Enforcement of Student Discipline Character, What School Principal Acts?

Triluqman, Heri

Modeling Android-Based Camcorder Simulator Application as A Learning Media for Cinematography Course

Tristanti

Out of School Learning in Study Tour Program For Improving Social Competence Students in Gembira Loka Zoo

Tuerah, Roos. M. S.

Analysis of Teacher Performance on Learning Managment in Primary School

Ulfatin, Nurul

Life Skills Potential Mapping of School Students in Rural and Urban Area

Undarwati, Anna

The Psychological Condition Differences Between the Rural and Urban Poor Society

Us Djuko, Rapi

Application of 'say yes or no' Game in Instilling Character Education in Early Childhood

Utami, Ade Dwi

Early Childhood Education Teachers' Effective Communication Based Teaching Skill

Utanto, Yuli

Role of Self-Regulated Learning in Early Childhood Education Learning

Utoyo, Setiyo

Kinesthetic Game Model to Improve Early Mathematical Ability in Early Childhood

Wahzudik, Niam

Developing Electronic Textbook for Students in Curriculum and Education Technology Department, Faculty of Education, Semarang State University

Wahzudik, Niam

Management of Educational Technology Implementation In Learning Praxis

Waluyo, Edi

Early Childhood Education Standard: Towards Equality Early Childhood Education Services in Indonesia

Wantu, Tuti

Students' Social Interaction Ability at Class Viii Of Mts Negeri Gorontalo

Wantu, Tuti

Student's social interaction ability at class VIII of MTS Negeri Gorontalo

Wedi, Agus

Mapping of Learning Achievement and Profile of Graduates of Bachelor of Education Technology in Several Universities in Indonesia as an Effort to Strengthen Development Profession of Comnetitive Instuctional Technoloꝝ

Wibawa, Lutfi

Identification of Learning Needs of Youth: The case study at the Tourism Village Bejiharjo, Karangmojo, Gunungkidul

Wicaksono, Dirgantara

Preparation of Strategic Plan at State Vocational High School 26 Jakarta

Widhanarto, Ghanis Putra

21st Century Competencies and Its Implications on Educational Practices

Widhanarto, Ghanis Putra

Freedom Material in Peace Education Based-Local-Wisdom as Hidden Curriculum

Widianto, Edi

Profile Gender: The Study of Education, Health, Labor, and Social Culture

Widodo, Suwarno

Teaching Character Education to Primary School Students through Javanese Ethnolinguistics

Widyaningrum

Scientific Article Education Evaluation Of Inclusion Of Junior High Schools In Central Java

Winahyu, Sri Estu

Quality Profile Questions of PGSD Students in Learning

Winarno, A. Rachmad Djati

Academic Procrastination of Undergraduate Students: The Role of Academic Self-efficacy and The Big Five Personality Traits

Windiarti, Rina

Developing Entrepreneurship Activity Based on Local Culture in Early Childhood

Wiyono, Bambang Budi

The Effect Of Education Background On The Teachers' Morale In Conducting Their Profession Duties

Wulandari, Retno Tri

The Implementation of Song and Motion Learning Through the Model of Beyond Center Circles Time(Bcct) to Improve Early Childhood Creativity

Yafie, Evania

Development Game Edutainment Combined with Multimedia Learning to Improve Cognitive and Naturalistic Intelligence At 5–6 Years Old Kindergarten

Yarmis

The Improvement Of The Guidance And Counselling Teachers Or Counsellors' Understanding On The Five Focuses Of Individual Counselling Service And Their Application

Yuca, Verlanda

The Importance of Infrastructure Facilities in Counseling Services

Yulianingsih, Wiwin

Adult Interest On Following English Course at BEC Kampung Inggris Pare Kediri

Yulsyofriend

The Early Childhood Learning Approach in The Role Playing Center

Yulyanty

Developing Moral Values-Based Character Ingrade IV of Primary School

Yuniawatika

Quality Profile Questions of PGSD Students in Learning

Yus, Anita

The Ability Of Teachers To Organize Science Learning For Early Childhood

Yusnadi

The Influence of Group Leadership and Climate Group to the Empowerment of Farmer Group in the Village of Sumber Rejo Beringin Subdistrict Deli Serdang Regency

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The Influence Of Group Leadership And Climate Group To The Empowerment Of Farmer Group In The Village Of Sumber Rejo Beringin Subdistrict Deli Serdang Regency

Yusuf, Munawir

The Role of Classroom Behavior Management in Enhancing Student Emotional Intelligence

Yuyarti

Development of Learning Media of Animation Video as Learning Sources of Cultural and Craft Arts

Zainil, Melva

Learning Fraction With Indonesia Realistic Mathematics Education (pmri)

Zainuddin, H.M.

Educational Philosophy as Social Agent of Changes

Zaiyasni

Increasing Learning Result of Student IV Students Using Constructiveness Approach

Zuardi

Development of IPS Learning Characterized by PAKEM in Primary School

Zuhdi, Ulhaq

Program Evaluation Basic Education of Special Service Class at Surabaya Primary School

Zulaikha, Siti

Autonomy And Community Participation On The Implementation Of School-Based Management In The City Of South Tangerang

Zulkarnain

Indigeneous Learning With Local Traditionl Inheritance To The Young Generation Of Ngada: Village Comunnity

Zuwirna

Evaluation of Student Training Implementation in MSK Course At Educational Technology, Universitas Negeri Padang: Perspektive Training Participants



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Kinesthetic Game Model to Improve Early Mathematical Ability in Early Childhood

Authors

Setiyo Utoyo

Corresponding Author

Setiyo Utoyo

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The purpose of this research is to develop kinesthetic game model in improving early math ability in group B TK Damhil Gorontalo. The method used is research and development, developed by Borg and Gall. Model development is done through the requirement analysis phase, product development and testing. After a number of experiments, input from teachers using this model is fun, meaningful, has health value and expert advice adds a more cognitive and constructive thinking style. The effectiveness of the model test shows a significant improvement in the process of assisting children with early mathematical abilities in early childhood (Kindergarten). The results of this study are kinesthetic product models in the form of guidebooks, teaching materials, media and assessment

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Kinesthetic Game Model to Improve Early Mathematical Ability in Early Childhood

Setiyo Utoyo

Universitas Negeri Gorontalo, Gorontalo, Indonesia

e-mail: setyo.utoyo@gmail.com

Abstract

The purpose of this research is to develop kinesthetic game model in improving early math ability in group B TK Damhil Gorontalo.

The method used is research and development, developed by Borg and Gall. Model development is done through the requirement analysis phase, product development and testing. After a number of experiments, input from teachers using this model is fun, meaningful, has health value and expert advice adds a more cognitive and constructive thinking style. The effectiveness of the model test shows a significant improvement in the process of assisting children with early mathematical abilities in early childhood (Kindergarten). The results of this study are kinesthetic product models in the form of guidebooks, teaching materials, media and assessment

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1 INTRODUCTION

Mathematical ability is one of current phenomenon talked by all people particularly in parents' group. One of purposes the parents register their children in PAUD (Early Childhood Education) institution is making the children master mathematics. Lots of parent, still, consider that smart kids are those who master or capable in *calistung* (reading, writing and counting) as early as possible. The parents are worried about their children in regard of mathematical mastery due to one of school admission tests is the mathematical mastery.

Jamaris (2009) thinks that mathematical ability is one of abilities obtained from varied processes and it is not mastered suddenly. Development of person's mathematical ability is based on stages of the person herself/himself. Children's mathematical ability requires to be developed with varied processes which are able to stimulate properly thus the ability is optimally developed.

Piaget in Subarinah (2006) states that, early children's mathematical ability is performed through three level of stages: 1) level of concept understanding namely the children will understand certain concept through experience of doing activity/ play with real objects, 2) level of transition namely

process of thinking transition from real understanding to introduction of abstract symbol, where the real objects are existed and started to introduce form of the symbol, 3) level of number symbol namely opportunity to know and visualize number symbol towards real concept they understood.

In theory of mathematical learning of Dienes or known as Joyful learning, it explains that person's learning process is observed from level of the cognitive ability, in teaching and learning process, level of cognitive becomes one of important things due to it depends on person's age, thus learning for adults is different with children's.

Based on finding of preliminary study in several Kindertartens in Gorontalo area (Kindergarten, henceforth called by TK, TK Damhil, TK Negeri Pembina Ki Hajar Dewantoro, TK AL Murqi, TK Al Islah, TK Al Wirabuana and TK Raudhatul Jannah) in semester II academic year of 2016/2017 and finding of interview with teachers and principals of Kindergarten, it shows that issue of high parents' demand becomes obstacle which causes learning activity abandonment particularly in development of mathematical based on what is supposed to be, due to parents consider play activity is not important for the children as the parents think that truly learning is doing several Students' Worksheet in classroom. They want their children master reading, writing and counting before entering

further school level. This causes teachers are dilemma to use play in stimulating development of mathematical ability in every learning activity.

Issue of early mathematical development in early children is found in TK Damhil City of Gorontalo. Here, based on five indicators of children's early mathematical ability observed by researcher, namely classifying, matching, arranging, comparing and numbering, 27% out of 20 observed children have good criteria for early mathematical ability, 42% of them have sufficient criteria for early mathematical ability and 31% of them have less criteria for early mathematical ability. Based on the data, children's early mathematical ability in group B1 of TK Damhil City of Gorontalo is still in low category (Observation in April 2017).

Research finding of Mooney, et.al (2009) showed that children learn mathematics through games and exploration such as telling story, singing, kinesthetic, imaginative and role playing. These methods are more interested and joyful due to students are involved in activities of their world. Game for children is very important due to it can develop creativity, practice kinesthetic, practice concentration, persistence and body endurance for balance of the body.

Based on the previous background, the researchers are interested in designing game model particularly in development of early children's mathematical ability. Then, development activity of children's mathematical ability can be performed through kinesthetic game. Kinesthetic is an ability to express idea, strength/ power, skill and him/herself related to body movement. In kinesthetic game, children love things related to movement such as sport, art (pantomime, acting and choreographer) and hand skill.

The applied kinesthetic game is expected that can develop children's early mathematical ability namely fun game, where children involved directly. Activity in kinesthetic game is more focused on rough motoric activity.

Generally, definition of mathematics is an ability which can be mastered by someone in solving several daily cases. This is related to patterns, order, classification, size, concept of number, one to one correspondence, concept of geometry form, doing estimation and processing simple data by manipulating and using real media before operating abstract symbols as well as doing interaction through games.

Susan Smith (2009) in her book mentions that there are several concepts of early children mathematics namely a) matching the concept of one

to one correspondence, b) classification c) comparing and d) ordering or seriation. This opinion explains that mathematics for early children is started from children learn to match, classify or place objects based on certain form or category, compare and similarity. Kennedy (2008) states that concept of mathematics is a) matching and discriminating, comparing and contrasting, b) classifying, sorting and grouping, c) ordering, sequence and seriation.

In introducing to children, it is easier if they are given opportunity to experience themselves either using real objects due to in this stage they learn to use symbols and they are not able to think systematically.

Minetola (2014) mentions several mathematics stages of early children are started from small number recognition, meaningful object counting, increasing magnitude concept and counting based comparison, number after knowledge, comparison of neighboring numbers, number after equals 1 more, mentally adding 0 and 1, mentally adding 2 to 5. This opinion means that introduction to small number refers to learn to count, increase concept of counting based on ability in dividing number, divide close numbers, after that multiply number 1 or more, add number 0 and 1, add number 2 to 5.

Based on previous elaboration, it explains that early mathematical ability has stages required to be recognize in order to ease the researchers to determine activity properly and appropriately based on early children.

Hurlock in Musfiroh (2008) states that playing is an activity which is performed only for fun without considering final result. Santrock (2012) states that playing is a fun activity performed for the sake of importance of the activity itself. Meanwhile, Freud and Erikson in Santrock (2012) state that playing is as a media to improve cognitive development of children. Referring to previous several opinions, kinesthetic game in this research is a game performed in form of kinesthetic movement in improving early children's mathematical ability.

Kinesthetic game is a skill with movement characteristics which involves big muscle and it contains no certain purpose. Like fundamental movement of kinesthetic skill such as walking, jumping and throwing.

Formation process of movement in human does not occur automatically, instead, it is accumulation of learn and practice namely by understanding movement and doing it repeatedly and it is followed by awareness of between right or

wrong of the movement. Therefore, motoric skill is an ability of doing movement efficiently and effectively. In general, skill is a term mostly related to someone as skill to do specific purpose (Ricard, 1998).

This research will develop 5-6 yo children mathematical ability through kinesthetic game. The activity is performed through activity which involves children directly in the game designed/planned by the researcher. Learning as a game which involves movement of rough motoric in children, in the activity is designed by referring to development of mathematical concepts based on their age.

Kinesthetic game is simulated with motoric movement game of balance mastery, dynamic movement and motoric skill. Thus, children will be comfortable and happy as well as interested to follow the activity. This condition will ease children in absorbing new information about mathematical concepts simply.

Through kinesthetic game, instead of mathematical ability, children can be skillful, and their skill and attitude can be developed simultaneously. Skill, in this case, can be singing, motoric skill even attitude can be instilled from early. Children attitude can be observed in form of how they are able to obey rules in the activity, mutual respect in group activity, sensitiveness towards others or sympathy, and how their attitude in accepting loss and victory in the game.

Then, early children's mathematical ability developed by researchers in this research through kinesthetic game is based on above fundamental theories namely: 1) ability of classifying object, 2) ordering, 3) separating and 5) comparing.

2 METHODS

This research uses research and development procedure by having method refers to research model of Borg and Gall in Abdullah, 2008 which consists of five steps namely: 1) doing analysis product that will be developed, 2) developing early product, 3) validating of expert and revision, 4) doing small scale field trial and product revision, and 5) big scale trial and final product.

Research samples are determined by purposive sampling and the samples are chosen by the researcher after conducting preliminary study in TK in Gorontalo area. They are TK Damhil as first trial and TK Al Murqi and AL Izlah as second trial.

Technique of collecting the data uses 1) check list of field observation through observation sheet and interview, 2) check list of assessment

towards early mathematical ability of TK children, 3) questionnaire, 4) instrument of expert assessment, 5) field note, 6) questionnaire as assessment instrument, and 7) check list of assessment towards early children's early mathematical ability. Instruments of early children's early mathematical ability in the research are observation, questionnaire and test. Technique of analyzing data uses qualitative analysis when data collection is ongoing and after data are collected in certain period by summarizing data to choose main and important things. Quantitative data obtained from questionnaire are analyzed by using descriptive analysis with percentage, while data of test result (pre test and post test) about early mathematical ability of TK children are analyzed by t test.

3 RESEARCH FINDINGS

Finding of research and development is finding of preliminary study conducted in several TK in Gorontalo area found that teachers do not have yet particular method in handling issue on early mathematical ability in children. The applied ways run conventionally such as teachers mostly give instruction, they used to write on the whiteboard, they still use old tradition which focuses on classroom activity or they do not do outdoor activity in learning mathematics.

Thus, it can be concluded that kinesthetic game is an innovative model to improve early mathematical ability in Gorontalo area. Kinesthetic game model is designed through deep theoretical review process and it will be conducted several times for field trial.

Finding of implementation of trial for kinesthetic game in development of children's mathematical ability in TK Damhil Gorontalo show pleased fact. Children look happy in following this learning model and their finding of mathematical learning improves significantly. Based on the finding, thus for next, the researcher will develop a model by doing wide trial to several TK in Province of Gorontalo as well as dissemination model.

This model is developed by concerning characteristics of early children as well as facilitating different learning style and have been through process of expert validation. The model of kinesthetic game is completed by guideline book, play media (APE) and learning media of early children's early mathematical ability. Finding of recommendation for peers and expert validation obtain conclusion that is product of kinesthetic game model is practical and effective to be used by

teachers, as well as effectiveness of the developed model.

Based on research findings, it found that handling of learning issue on early mathematical ability in children requires teachers' mastery, either in optimizing media in order to be more interested and fun or in using social-emotional approach. Topic delivery should be based on children's life context and creating creation and imaginative in learning.

4 CONCLUSIONS

Based on preliminary study and finding, it obtains following conclusions:

- 1) teachers do not have yet particular method in handling issue on early mathematical ability in children. The current ways run conventionally, such as teachers mostly give instruction, they used to write on the whiteboard, they still use old tradition which focuses on classroom activity or they do not outdoor activity in learning mathematics.
- 2) Kinesthetic game model is designed through deep theoretical review process and several times of field trial process. This model is developed by concerning characteristics of early children as well as facilitating different learning style and have been through process of expert validation. The model of kinesthetic play is completed by guideline book, play media (APE) and learning media of early children's early mathematical ability. Finding of recommendation for peers and expert validation obtain conclusion that is product of kinesthetic play model is practical and effective to be used by teachers, as well as effectiveness of the developed model.
- 3) Finding of kinesthetic game model trial in first stage is conducted in Group B of TK Damhil City of Gorontalo proves that effectively, kinesthetic game model can improve early children's early mathematical ability.

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