# English for Math-Learning Model Based on Local Wisdom with Constructivism Approach for Kindergarten Students

Ririn Ambarini
*English Education  Department*
*Universitas PGRI Semarang*
Semarang, Indonesia
ririnambarini@upgri.ac.id

Arso Setyaji
*English Education  Department*
*Universitas PGRI Semarang*
Semarang, Indonesia
arsosetyaji@upgri.ac.id

Dian Ayu Zahraini
*Early Childhood Education  Department*
*Universitas PGRI Semarang*
Semarang, Indonesia
dianayuzahrainii@upgri.ac.id

*Abstract*— **Theory of learning model of English for Math based on local wisdom with constructivism approach in early childhood is expected to be used by teachers of PAUD (Early Childhood Education), as a reference in improving students' communication skills as a tool of thinking so as to boost all potentials of children by promoting freedom of choice , stimulating creativity, and character growth, especially the love of local culture.**

**The study began  with a preliminary study to map the implementation of learning English for Math based on local wisdom with constructivism approach in early childhood education  followed by a planning phase based on needs analysis and   design of the English for Math learning model based on local wisdom with constructivism approach. The result of the analysis is used as a reference for making a guide for learning model of English for Math based on local wisdom with constructivism approach that can be used by PAUD teachers in their respective schools.**

*Keywords— English for Math, Local Wisdom, Constructivism, Learning Model*

## I.   INTRODUCTION

Early ages are the golden period or the golden age which as a foundation for subsequent growth and development. Since the early age period is proven to determine the potential development of children, it is fitting that character education in which the love of local culture begins from pre-school days. Character education to love and use local cultural products in PAUD institutions can be implemented integrally in learning [1].

The selection of learning media should be based on various characteristics of child development, because of that, the teacher must design a suitable learning program to optimize the aspects of child development. The various stimuli in the learning used are concrete according to the early childhood cognitive development phase. This will make it easier for them to understand the nitty-gritty of new experiences encountered in their environment and integrate them into the pre-existing structure of understanding.

Human resources are a great potential if managed properly from the beginning or from an early age. Human resource management from an early age rests on how to maximize the potential of children from an early age without coercion where learning is packed with a fun and exciting atmosphere. Based on the above description, the appropriate choice of materials adapted to the age of the child is bilingual English Math for early childhood with media of stimulation of child development based on local culture adapted to the level of difficulty and needs of early childhood, as one of the material in the education of early childhood is very appropriate. Bilingual Math for early childhood learning with local-based stimulation media helps to improve students' language communication as part of literacy activities because in bilingual learning activities Math for Kindergarten, students will be exposed to develop numeracy skills with interesting material tailored to the material that exist in Indonesia [2]

The development of each child is not the same because each individual has a different development. Nutritious and balanced foods and intensive stimulation are essential for such growth and development. If the child is given intensive stimulation from the environment, then the child will be able to undergo development tasks well [3].

The purpose of early childhood math learning is to give students the opportunity to be prepared for their advanced knowledge, skills, and attitudes towards Mathematics while providing literacy experience in numeracy. So that it will create curious students who are active learners with a variety of knowledge, life experience and individual background. A key component in developing successful arithmetic learning is by making connections to the background and experience.

The provision of Math bilingual learning with local culture-based stimulation media for early childhood education focused on the development of value-based mathematics education is an important part of creating superior and qualified human resources. At the beginning, students know learning, because of that they need to be trained on how to improve the ability to think critically and creatively that can be facilitated through learning mathematics.

## A. Bilingual Mathematics Learning for Young Learners

While technology, business and politics interact with other countries becomes a norm, language and culture are key to every successful individual in the new global community. Effective and high-quality education includes cultural and linguistic learning for all students. Research shows that all students will benefit or benefit from being bilingual and biliterate in their own language and other languages [4]. In this case bilingual educational programs are central to making that vision a reality [5].

Bilingual learning for early childhood will work well if the learning activities packaged for early childhood can help develop cultural pride and identity in the new language they are learning in the mother tongue. It is crucial that teachers have the ability to assemble all learning activities carefully, step by step, to build the previous child's knowledge and develop skills and concepts that are integrated into learning materials one of which is mathematics [6].

Young learners begin to develop a mathematical understanding through experiences with various types of real objects provided in learning centers as well as practical situations (such as beams, pegs, buttons, cooking utensils, etc.). Provision of learning activities that are able to maximize critical and creative thinking skills can be facilitated through creative math learning for early childhood that can create a cognitive condition and a solid attitude in thinking to solve the problems faced[7]. To make this happen it will be important for educators to maximize strategic efforts in education with respect to the coaching and cultivation of 'noble, gradual and sustainable cultural literacy (; [8]; [9]).

The principle and standard of early childhood mathematics learning according to [10] is that instructional programs from pre-school to grade 2 should enable all students to understand the meaning of the operation and how the operation is interconnected. Furthermore, expectations for pre-school classes through grade 2 should understand the various meanings of addition and subtraction of integers and the relationships between the two operations, understand the effects of adding integers, and understand situations requiring multiplication and division as grouping objects evenly.

While the purpose of counting for early childhood according to [11], the first is for children to think logically and systematically at early age, through observation of concrete objects, pictures or figures around the child's environment. Furthermore, early childhood will have the accuracy, concentration, abstraction and high appreciation and have an understanding of the concept of space and time so as to estimate the possible sequence of an event that occurred in the vicinity. And the last is that young children are expected to have creativity and imagination in creating something spontaneously as a form of their literacy development.

## B. Children Learning Experience as Literacy Development

Early childhood education is a learning environment designed to suit the child's age level and is applied with attention to the needs and differentiation of children individually with interesting themes that integrate and teach the whole area of the core curriculum of language arts, mathematics, social, and art to develop their first liters in their childhood development. In this case children will learn literacy through play by using educative media and active learning resources, innovative, creative, effective and fun, based on local culture ([12] [8][9]).

Based on his research on how children acquire knowledge, Piaget concludes that the knowledge is built into the thinking of the child. According to Piaget, all knowledge is a construction (formation) of one's activities or actions. Knowledge is not something that exists outside, but it is within the person who forms it. Knowledge always requires literacy experience ([13] [8]; [9]). In other words knowledge can not be passed on in the finished form. One must build his own knowledge.

In learning constructivism teachers have a role as a mediator and facilitator in the classroom. The most important task is to appreciate and accept the creativity of any student while showing whether creativity is good. Teachers must also have creative ideas and materials widely and deeply so that they can more flexibly accept the creativity of students of different levels so as to make their literacy development to sound their ideas and expression [13].

Students also need to have initiative in raising issues and creating new creativities to assist in changing new ideas. They can also improve their social interaction ability, ie cooperate with other students, increase their knowledge and understanding. Because students are involved continuously, they become more understanding, confident and able to interact socially well. They will also be more daring again in learning and in fostering new knowledge to become literate and function in society. Thus, teachers in constructivism approach should be able to attract students' attention [9].

## C. Local Wisdom as Cultural Literacy Learning

National development in all fields has been experiencing various advances besides giving a negative impact in the shift of ethical values in the life of nation and state. The visible shift in people's lives today is a shift towards cultural and linguistic values, the value of social solidarity, courtesy, shame, and the love of the homeland fading away. One of the many solutions proposed to overcome or reduce the problem of culture and character of the nation is through cultural literacy education as a preventive alternative, to build a new generation of better nation [8][14].

Local wisdom is part of cultural construction. Local wisdom refers to a variety of growing and emerging cultural treasures recognized as important elements capable of reinforcing social cohesion among citizens. Local wisdom is still dominantly tainted with customary values such as how a social group does the principles of conservation, management and exploitation of natural resources. The realization of the form of local wisdom which is a reflection of the system of knowledge that comes from cultural values in various regions

in Indonesia, is already much lost from the memory of the community [15].

Cultural-based education is a cultural literacy that develops cultural values in character education in students so that it becomes the basis for them in thinking, acting, acting in developing themselves as individuals, members of society, and citizens. The cultural values and character of the nation owned by these learners make them as citizens of Indonesia who have uniqueness compared with other nations. Creating a moral man, noble character and uphold the spirit of nationalism ([16];[9]).

In culture-based education, culture is interpreted as something inherited or learned, then passing on what is learned and turning it into something new as the core of the educational process. Therefore the task of education as a cultural literacy mission must be able to do the process; first the cultural inheritance, the second helps the individual to choose the social squeeze and teaches to perform the role, the third integrates the various individual identities into the wider cultural sphere, and the fourth must be a source of social innovation [17].

Language serves as a tool for understanding the culture, both present and preserved and future (by way of inheritance). Without language there will be no culture. Every society maintains its concept through cultural values and cultural systems by maintaining functions, units, boundaries, forms, environment, relationships, processes, inputs, outputs, and exchanges [18]. Highly low cultural values rely heavily on the defense of society in operationalizing the system [19]. It is therefore very important to be a culturally literate learner so that through them culture can be maintained and inherited.

[20]. states that the lack of appreciation of local culture by the general public becomes a continuing sustainability for many governments. In the context of the Indonesian state, central and local governments have a mission to maintain knowledge about local culture as a means to maintain the spirit of national unity. And education is the right forum for local culture to be integrated into various school subjects in the curriculum so that students will develop cultural literacy better through literacy experiences at school.

[21]. conveyed in his paper that culture and education are two things that can not be separated. Both concepts can be said to be indistinguishable, as the main definition of education is Acculturation. In addition, culturally oriented education policy is expected to go through a process that does not create a sharp line between formulation and implementation so that education is for all and by all.

### D. *Bilingual Mathematic Learning Activities as Literacy Experiences at School*

Children aged 5-8 years ability to think moving from pre-operational stage to concrete operations is called the transition period, where the children's ability to think move from the ability to think dominated by visual perception to the ability to think logically [22].

According to [23] education needs to be done by using a comprehensive approach. A comprehensive approach to education can be viewed in terms of the methods used, participating teachers (teachers, parents), and the context of value education (school, family). [24] states in a constructivism approach that learners are key to learning that is influenced by prior student knowledge, experience, attitudes and social interactions. In this case, according to Geraldine [25] protege constructs knowledge, intelligence and morality through a series of very influential stages in early childhood education.

[26] says that in early childhood learning when a constructivism approach is applied, a teacher must understand not only the change and development of the students but also the activities in the learning. The main purpose of this lesson is to prepare young children to acquire, understand, and construct knowledge and literacy in which they not only acquire knowledge but also experience it and then use it as a solution to the problem.

Learning English for Math for early childhood can be implemented by using three teaching media based on local culture. The first is he real object of natural resources such as natural stone, shell shell, sapodilla seeds, etc. The second is the learning media that comes from Java game such as dakon, and sudahmandah. And the third is jajan pasar that is used to maintain local wisdom as part of maintaining the love of local cultural products. Learning media is a teaching tool in the implementation of English for Math for early childhood with the media stimulation of child development based on local culture.

There have been many researchers who have undertaken studies in the field of bilingual learning, both in the field of English for Math and other material areas where the stimulation media used also maximize the source of local culture. As well as research conducted by [27], the importance of learning media for early childhood that contains interesting stories and also fun real objects are often used during learning so as to improve communication reactions among students and increase the values of individual characters to love the local products used as teaching media.

Learning Mathematics for young learners in Kindergarten is essential where mathematical strategies and problem solving will be increasingly important in all areas of business in the future [28] Recent developments in Mathematics teaching have revealed that the integration of language learning and the learning of Math as the forms of literacy activities can create a model that is comfortable and acceptable to students and classroom teachers [9]

PAUD educators should be skilled in helping children understand the usefulness of tools and encourage them to have problem-solving skills. The process of learning in childhood will be a source of enjoyment and mathematical appreciation for the future where mathematical strategies and problem solving will be increasingly important in all areas of business.

The teaching and learning process is delivered bilingually where two languages are implemented. Both languages are Indonesian and English. English is used as a medium of

instruction and the percentage of usage is adjusted to students' difficulty level in the range of 10% to 50% of usage compared to the number of Indonesian language usage.

This section provides the development of the kindergarten students performance in English for Mathematics skills especially in indentifying number and number sense as literacy activities by using teaching objects and materials designed based on local wisdom. In this case, teaching and learning activities are aimed at not only developing students' cognitive skills; Their ability in communication and mathematical concepts, but also their love of their country's local products.

**Table 1**
**Early Language and Literacy Assessment in Mathematics Learning**
**Initial Language & Literacy**

| Initial Language & Literacy Children develop knowledge and skills related to: | Indicator | Examples that can be observed |
|---|---|---|
| A. Communicate and Listen | • Ask and answer simple questions about math stories using learned phrases and memorable vocabulary | The child says, "I have a cute cat, he has 5 baby cats, so I have 6 cats now. |
| | • Develop the ability to understand and use language to communicate information, experiences, ideas, feelings, opinions, needs, questions, and for other varied purposes related to mathematical stories | A child pointed to a sad face when asked, "I'm sad that my two chicks are dead?" |
| | • Communicate quite clearly and understandably to familiar and unfamiliar listeners | Class Visitors understand the sign of the child and / or verbalizations that he wants more juice. |
| | • Uses more complex and more varied vocabulary for spoken language in the matter of simple math stories for early childhood | The child says, "three caterpillars will form three cocoons after eating six leaves. |
| | levels | |
| | • progress in listening and understanding of English while maintaining the home language, when the two are not the same | Children learn English respond appropriately to simple instructions spoken (eg "Hang your five umbrellas on the left.") |
| | • Demonstrate improvement in home and English proficiency | A child pointed to a book on the shelf and said, "Mother bought me five story books." |
| B. Knowledge of Books and awards Understanding and appreciating that books and other forms of printing have a purpose | • Trying to find and enjoy the experience with pictures, books, and other printed materials | The child asks a fairy tale to read or look at the photos in the magazine. |
| | • Keep and care for books | The child takes three books from the floor and returns neatly to the shelf with the cover facing out. |
| | • Listen and communicate information about favorite books | When shown five different books, the child selects a book about the caterpillar and sits down to read it. |
| | • Realize that the book provides information about the world | After a walk in nature, the boy sees eight non-fiction books and searches for a picture that matches the leaves he collects. |
| | • Understand that books have titles, authors and illustrators | The child says, "Of the five books on the table, there is one book by Eric Carle." |
| | • Understanding the reading per page at a time sequence from front to back | When reading with other colleagues, the child helps the other in identifying the sequential book by indicating that |

| | | |
|---|---|---|
| C. Understanding understands that spoken and written words have meaning | | the page is missing or by telling his friend, "Let's go to page fifteen." |
| | • Combine some literacy activities into drama games | When playing with a child's phone says, "I'll take a sheet of paper and write a message" and scribble on paper. |
| | • Identify objects from books | The child identifies the number of animals in a book entitled Over in the Meadow. |
| | • retelling information from a story | Children tell stories through spoken words, gestures, symbols, images, and / or signs of what happens when cats eat mice. |
| | • Demonstrate an understanding of the basic plot of a simple story in various ways (eg, retelling, role playing, portraying, responding to questions) | Children recount Mouse deer and Crocodile, the amount of food, the number of animals there by looking at the pictures in the book. |
| | • Make adequate predictions about what will happen next or how it might turn out to be different in a story | When listening to the story, the child gives a reasonable answer to the teacher's question "What do you think will happen next ?, how many animals are eaten by the lion" |
| | • Make observations about the use of words and pictures | The child asks the teacher to write a story about his picture. How many is your brother? how many is your sister? |
| | • Understand the main idea of simple information | When asked about what the book was, the boy replied, "Adi has one female friend and one male friend." |

Adopted from[28]

Assessment indicators used to measure language assessment and preliminary literacy in learning mathematics to learners in areas of communication and listening, knowledge of books and awards of understanding and appreciation that books and other forms of print have a purpose, and the understanding that oral and written words have meaning can be seen in table 1.

## II. CONCLUSION

There are many ways that can give us the development of our learning. Whenever we see children grow from childhood to toddlers, we will be able to observe the amount of literacy activities that enables children to understand their widespread environment. Early childhood education is very important because the early years are regarded as a golden age. These early years provide the basis of language, physical dexterity, social understanding, and emotional development that children will use for the rest of their lives. How much knowledge is gained before they are ready to get their first formal education in formal school is very crucial. These children teach themselves by gathering information and experiencing the world around them. Such learning exemplifies construtivism - an idea that has caused much excitement and interest among educators [29].

Constructivism emphasizes the importance of individual knowledge, beliefs, and skills to the learning experience. It recognizes the construction of new understandings as a combination of previous learning, new information, and readiness to learn. Individuals make choices about what new ideas should be accepted and how to adapt them to their view of the world [29]. Therefore constructivism approach can be implemented in Mathematics learning process where it is very crucial for teachers to be able to provide direct material specially designed for kindergarten students. Through a constructivism approach, young learners will learn new material by linking their past experiences that they already know and understand so that there will be new assimilation to understand new knowledge.

There is a benefit of giving bilingual learning to kindergarten students as it will develop students' skills in cognitive thinking, mathematical concepts, logic, problem-solving materials, and decision-makers as evidence of literacy development. Because bilingual mathematical learning is appropriate to be applied in Kindergarten through constructivism approach, thus the results of this implementation improve not only student development in Mathematics skills but also communication skills but also communication skills.

REFERENCES

[1] Ismail SM & M. Agung Hidayatulloh, "'LEARNING TO LIVE TOGETHER': PENANAMAN KARAKTER PADA ANAK USIA DINI DI," pp. 229–246, 2014.

[2] C. Manning, M. & Kamii, "Whole language vs. isolated phonics instruction: a longitudinal study in kindergarten with reading and writing tasks.," *J. Res. Child. Educ. 15(1), 53-66.*, vol. 1.

[3] F. Jalal, "Perluasan Layanan Pendidikan Anak Usia Dini.," *Bul. PADU J. Ilm. Anak Usia Dini, 2(02) 20–21.*, vol. 2, 2003.

[4] A. J. Acevedo and C. P. Schools, "Bilingual Educa on Handbook 2012," 2012.

[5] B. and T. P. Rodriguez-McCleary, *The LEP-Special Education Interface: Building Bridges, A presentation at NABE 2002 (National Association for Bilingual Education)*, no. 2002. Fairfax Public Schools, Fairfax, VA.

[6] S. Soderman, K., A., Wescott, L.B., Jie, "Bridging Two Languages, Enganging Activities for Bilingual Immersion Programs.," *Young Child. Web. Novemb. 2007.*, 2007.

[7] D. H. Clements, *Mathematics in preschool. Teaching Children Mathematics,.* 2001.

[8] R. Wyse, Dominic, & Jones, *Teaching English, Language and Literacy.* USA and Canada, 2008.

[9] K. Winograd, "Critical Literacies and Young Learners. Connecting Classroom Practice to the Common Core. Routledge.," *Taylor Fr. New York*, 2015.

[10] N. C. of T. of Mathematics., "Professional standards for teaching mathematics," 1991.

[11] Depdiknas, "Pembelajaran, Pedoman Kanak-kanak, D I Taman."

[12] Pemprov Jateng Diknas, "PENGEMBANGAN PENDIDIKAN ANAK PROVINSI JAWA TENGAH," pp. 2013–2018, 2018.

[13] Suprno, "filsafat-konstruktivisme-dalam-pendidikan-paul-suparno-39179." .

[14] A. Sulhan, *MANAJEMEN PENDIDIKAN KARAKTER DALAM MEWUJUDKAN MUTU LULUSAN*. 2015.

[15] Masita, "Pendidikan Karakter Berbasis Budaya Lokal pada Masyarakat Muslim," vol. 15, pp. 302–320, 2012.

[16] M. Khusniati, "Pendidikan Karakter Melalui Pembelajaran Paud. Jurnal Pendidikan PAUD Indonesia," vol. 2, pp. 204–210, 2012.

[17] Ni Wayan Sartini, "Menggali nilai kearifan lokal budaya jawa lewat ungkapan (bebasan, saloka, dan paribasa)," vol. V, no. 1, pp. 28–37, 2009.

[18] oktavianus, "NilaiBudayadalamUngkapanMinangkabau.pdf." .

[19] D. Djajasudarma, T. Fatimah, "Nilai Budaya dalam Ungkapan dan Peribahasa Sunda.," in *Pusat Pembinaan dan Pengembangan Bahasa.*, Jakarta, 2002.

[20] Y. Prastiwi, "Transmitting Local Cultural Knowledge through English as Foreign Language ( EFL ) Learning as a Means of Fostering ' Unity in Diversity ,'" vol. 2, no. 3, pp. 507–514, 2013.

[21] Pai OBANYA, "CULTURE-IN- EDUCATION And," no. December, 2005.

[22] J. V Copley, C. Copple, M. Hogarty, E. Wegner, and L. Thompson, "The Young Child and Mathematics Second Edition."

[23] H. Kirschenbaum, *100 ways to enhance values and morality in schools and youth settings. Massachusetts:* Allyn & Bacon., 1995.

[24] D. Dellafosse and C. Cook, "Foundations of Teaching," pp. 104–139.

[25] G. French, "Children's early learning and development," no. May, 2007.

[26] L. R. Kroll, "Constructing constructivism : how student- teachers construct ideas of development , knowledge , learning , and teaching," vol. 10, no. 2, 2004.

[27] N. A. Mukti and S. P. Hwa, "Malaysian Perspective : Designing Interactive Multimedia Learning Environment for Moral Values Education," vol. 7, pp. 143–152, 2004.

[28] Maine Department of Education, *State of Maine Early childhood Learning Guidelines.* .

[29] SCIMAST., "Building an Understanding of Constructivism. Southwest Consortium for the Improvement of Mathematics and Science Teaching. Winter 1995," vol. 1, p. 3, 1991.