

The Challenges of Optimizing Early Childhood Learning Process in the Era of Internet of Things

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Abstract—The general problem of early childhood education in Indonesia usually lies in the low acceptance of parents towards the implementation of Early Childhood Education, the problem of educator professionalism, the problem of financing the implementation of minimal education, and the low quality of Early Childhood Education. Through this study, the author will explain and analyze the use of traditional musical instruments as a model of learning in innovative and creative early childhood. It is expected that the analysis and information generated from this research can provide input for PAUD educators in Indonesia to improve the quality of education and interest in learning and productivity of early childhood. The research method used using qualitative approach descriptive with research method library research. The results of this study show that the quality of Early Childhood Education can be supported through creation to the maximum in utilizing local culture in the surrounding environment and can be found in certain activities. Playing traditional music, in addition to stimulating children's competence, can also increase the general knowledge of children, the love of children to the nation and the country, and admire the values of Indonesian cultural art. **Research Contribution:** The study of early childhood education learning model through traditional musical instruments contributes thinking for educators in developing the competence and love of students to local culture from an early age without having to abandon technological advances.

Keywords—*learning model, early childhood christian education, traditional musical instruments*

I. INTRODUCTION

It is undeniable that the Covid-19 pandemic has an impact on the world of education, including early childhood education (PAUD). The coronavirus outbreak inhibits teaching and learning activities that usually take place face-to-face. This is also the driving factor for PAUD teachers to inevitably struggle directly with the changing times. Collaboration between parents and teachers is important in the learning process in the era of the covid-19 pandemic [1][2]. How to teach onsite (face-to-face) should switch to how to teach using digital media. Teachers must also continue to provide the same learning to their students, online. Therefore, teachers are required to be IT literate in the era of revolution 4.0. This statement is supported by Widaningsih research, et al. which states that PAUD needs to be prepared further to respond to the industrial revolution 4.0 while lifting the quality of national education in the global world. Some aspects that need to be considered include: instilling value systems, critical thinking skills and innovating, improving teacher competence and appreciation, personalizing learning, and the use of technology [3].

Teachers in the digital age must be able to adjust to the changes and needs of today. Mastery of information and technology (IT) in learning is a must. Knowledge updates and skill upgrades are no strangers because it is a demand and standard that must be met as a teacher in the digital age for the sake of the quality of education itself. But behind these conditions, there are certainly other things that need to be considered by educators, namely how to make early childhood

learners in the IoT era still able to know the culture in Indonesia. By knowing the culture from an early age, it will engender their love for this nation as the purpose of Education according to Law No. 20 of 2003 on SISDIKNAS that education is a conscious and planned effort to realize the atmosphere of learning and learning process so that learners actively develop their potential to have religious-spiritual power, self-control, personality, intelligence, noble morals, as well as the necessary skills of himself, society, nation, and country [4].

The introduction of this culture can be achieved through creative learning models conducted by teachers, and of course, this can stimulate early childhood development. Munawaroh in his research proves this with a result that traditional game Engglek was proven effective to be tools to stimulate the development of Early Childhood in RA Masythoh singkir Wonosobo. Learning model by using traditional game engklek to stimulate aspects of children's development with the help of posters [5].

Combining culture and education to be a model of early childhood learning in the classroom has its challenges. Sensitivity is required to achieve ideal results. Age 0-6 years is the range of early childhood. Where there are opportunities to help various aspects of development, such as morals, religion, cognitive, social-emotional, language, art, self-discipline, self-concept, self-reliance, and motor physical [6].

Using traditional Batak musical instruments to help the development of the various aspects above is an idea that is worth trying and doing. This is because the Batak tribe has a variety of musical instruments that can be played, in a variety of ways.

Reflecting on the research of Widaningsih, et al. and Munawaroh, this paper wants to study the model of early childhood learning in the IoT era by using traditional Batak musical instruments, which is certainly different from the two studies.

II. METHOD

In this paper, the authors use a descriptive qualitative approach to the research method of library *research*. *Library Research* means researching existing literature and analyze the data systematically, which authors gather relevant information [7]. *First*, searching for the sources needed, whether in the form of books, articles in journals, news, and other written sources both printed and published on the internet related to learning models, traditional musical instruments, early childhood education. *Second*, the assessment of materials obtained by paying attention to especially the ideas discussed and the explanation of the subject matter. The library materials that will be collected as much as possible that have not been written for too long, about the topics raised relate to the latest things. *Third*, the presentation of literature studies in a discussion. With literature studies, the relationship between problems, theories, and researches relevant to them becomes

clear, so that the discussion is more focused on developing learning models for early childhood.

III. FINDINGS AND DISCUSSION

A. Early Childhood Education Learning Model

The learning method is a method that must be passed to achieve the goals set in the learning settings. While the learning model is a design or design that describes the process of detail and creation of environmental situations that allow children to interact in learning so that changes or developments occur in the child. The components of the learning model include concepts, learning objectives, materials/themes, steps/procedures, methods, learning tools/resources, and evaluation techniques [8].

The model of learning is a wrap or frame of the application of an approach, method, and learning techniques. Therefore, teachers in choosing a model in teaching must be precise with the goals and objectives that have been set. The selection of teaching models greatly influences the results to be obtained. And the right teaching model will lead to educational, conducive, and challenging learning. The learning model helps teachers in teaching, which facilitates, and accelerates learners in understanding and interpreting the content of learning.

In setting the learning model in the classroom, there are two things that teachers need to pay attention to, namely, the first goal to be achieved in learning. This goal becomes a benchmark in owning and establishing the effectiveness of the application of a learning model. Second, the condition of the student (learner). Not only pay attention to the goals that will be achieved as the subject of learning, but the condition of the learners also needs to be considered. Teachers must be able to understand the psychological, motor, and mental development of learners. therefore, teachers should not impose methods in a class that does not conform to the factors. It should be understood that each student has a different level of intelligence and has a compound intelligence so that if only listening and seeing not all students will gain a good understanding, then working on learning or active learning can be a way for each student to gain a meaningful learning experience.

B. Batak Traditional Musical Instruments

Traditional music is music that lives in society for generations in Indonesia, maintained as a means of entertainment. In general, the function of traditional musical instruments certainly serves to accompany the music that is available among the community. This traditional musical instrument certainly accompanies traditional events in every region in Indonesia. So many musical instruments in Indonesia, and one of them is a traditional Batak musical instrument that comes from North Sumatra. Batak tribe is one of the very large tribes in Indonesia and has a variety of traditional musical instruments. North Sumatran people have about 20 traditional musical instruments, namely Aramba, Hasapi, Taganing, Odap, Garantung, Kulcapi Karo, Drum Singanaki, Drum Sisibah,

Fondrahi, Sarune Bolon, Tulila / talatoit, Sordam, Balobat, Keteng Keteng, Tali sasayat / Sitalasayak, Gong panganak, Patricia, Ogung, Panggora and Godang [9]. The instruments are played in a variety of ways.



Fig. 1. Taganing instruments played by hit.

Taganing instruments, odap, garantung, drum sisibah, and godang are musical instruments. At the time of playing this instrument, both hands move according to the rhythm. Both hands must be consistent so that all limbs can coordinate. There needs to be conformity between what is thought and the beat rhythm.



Fig. 2. Someone plays Kulcapi Karoby plucking.



Fig. 3. Someone plays Sordam by blown.

Hasapi and Kulcapi Karo are played in a guitar-like manner. Tulita/Tataloit, Sordam, and Balobat are played by blowing [9].

Playing these instruments can help reduce stress in children, stimulate IQ development and train the child's muscles. As Muqowim said that musical instruments can help maximize motor in children [10]. In this era where people's knowledge about early childhood education is getting better and more creative, early childhood educators should try to take advantage of the availability of this traditional musical instrument to be used as teaching materials. With abundant cultural wealth and easy access to traditional musical instruments, the role of local culture in early childhood education can provide optimal support. The existence of culture in the child's environment can be easier to realize and enjoy, not only as information that is fleeting and encountered at a certain time but can also be felt in activities and activities in the classroom. Educators should strive to instill a sense of love and a sense of interest in local culture in early childhood.

C. Early Childhood Education Through Traditional Musical Instruments

Early Childhood Education is burdened to provide high teaching creativity by utilizing traditional musical instruments in their respective regions as inspiration for fun learning activities and deep knowledge. How these unique, beautiful, and valuable traditional musical instruments can be used as teaching materials to early childhood depends heavily on the educator's level of technological power, knowledge, and creativity. An effective way of learning for early childhood children in getting to know their environment is by playing [11]. They tend to explore the objects around them carefully and have a desire to try to hold and touch them. Such great curiosity must be utilized as best as possible.

Viewing musical instruments, playing musical instruments, listening to musical instruments, holding musical instruments, feeling tactile instruments and others, can help children's development in various areas. *First*, train the child's auditory [12]. Hearing the sound of this traditional instrument can help to train the child's hearing sensitivity to the tones played and can feel the sound of music (joyous, sad tone). *An auditory learner* is a child who is better able to understand the teachings by listening than feeling or seeing. The way that can be done is to listen to the sound of the instrument, then ask the child to identify the sound of the instrument. And listen to the song played by the instrument.

Second, train the ability to interpret information through senses [11]. The way that is done is after the child repeatedly hears the sound of the instrument and sees the shape of the instrument, then a picture and perception of the instrument begin to be created. When the child is allowed to see only the instrument without being heard, then the child is most likely able to imagine the sound that is removed from the instrument. Similarly, when the child has only heard the sound of the instrument, it will create a picture of the shape of the instrument in the child's mind.

Third, the physical development of the child is closely related to the motor development of the child. The motor is the

development of control of body movements through coordinated activities between the nervous, muscle, brain, and spinal cord arrangements. Motor development includes practicing fine motor and rough motor the way it is done is to introduce how to hit taganing or gong and use it [13]. While the fine motor is an ability associated with physical skills involving small muscles and eye-hand coordination. These fine motor nerves can be trained and developed through routine activities and stimuli. The way to do this is to introduce how to strum the guitar, flick the fingers, pat the fingers on the surface of the drums, tambourines, and musical instruments that require such abilities. Playing the flute can also help train fine motor on fingers.

Fourth, cognitively train learners' abilities to connect, assess and consider an event or event. Cognitive processes are associated with a level of intelligence that marks a person with a variety of interests especially when aimed at ideas and learning [12]. The way that is done is that all activities or activities performed while playing musical instruments can help the child's cognitive abilities. Examples: the initial process of hearing instructions, doing so, understanding them, repeating them, coordinating with teachers and other friends.

Fifth, train the art of learners a human work made based on the idea of ideas so that it has aesthetic value and can influence the feelings of others. The way to do this is to teach the child to play music can explore the potential that has not been seen. The child's hidden talents begin to come to the surface so that the talents can be stimulated and processed properly. Teaches the child to understand the tone and beats of music, increasing sensitivity.

Sixth, training attention according to William James, in his book *The Principles of Psychology*, defines attention as the concentration of the mind, in a clear and sharp form, against one of several simultaneous objects or of a sequence of thoughts [11]. The way that is done is when the child listens to the instructions, observes the instructions from the teacher, listens to the sound produced from the instrument, maintains the position of the hand while holding the instrument, good coordination with the teacher and friends while doing the activity, following the rules of how to play music is a series of activities that can help prolong the child's attention.

Seventh, eye and hand coordination is the cognitive ability to perform activities that involve the work of the eyes and hands at the same time. Your child will receive visual information through his eyes as a guide for the hand to perform certain movements. The way to do this is to give directions to the child on how to play traditional musical instruments correctly / imitative (musical instruments hit, pick, blow, press, swipe).

Eighth, the child's emotional social development is the sensitivity of the child to understand the feelings of others when interacting in daily life. Social development in children is characterized by the child's ability to adapt to the environment, making friendships involving his emotions, thoughts, and behaviors. The way it is done is: involve good cooperation

when playing music together as a harmonious group. For example: playing Gondang instruments, Sabah drums, etc., where good cooperation is needed to create a piece of beautiful music.

Ninth, the concept of quantitative is the concept of something, based on the number or number. The way to do this is: introducing tempo means introducing quantitative concepts; introduce pressure to the instrument to adjust the volume; introduce the exact time when sounding the instrument (turn) [13].

Tenth, a noun is a word that refers to objects, people, animals, and concepts or understandings. The way to do this is: introduce the names of various traditional musical instruments, introduce the names of parts of musical instruments, introduce the basic materials of the makers of musical instruments, and others. A verb is a word that describes an act or activity performed by a person. The way it is done is: when giving activities to children explain also knowledge of verbs. Examples: hit, pick, touch, tap, inflate, swipe, etc. Adjectives are words used to describe the nature or condition of a thing, whether it be a living being, an inanimate object, a place of time, and others. In a sentence, an adjective is commonly used to describe the condition of the subject (S) or object (O) of the sentence. The way that is done is when giving activities to children explain also knowledge about adjectives. Examples: soft, hard, slow, slow, fast, and others.

Eleventh, self-reliance can develop well if allowed to develop through exercises done early. Self-reliance grows with age. The way it is done is: teaching music to the child means also practicing the independence of the child, let the child enjoy his ability to play and listen to music. If the child can already enjoy playing music then independence begins to be formed if the child will try to play music correctly without any help from educators. Example: preparing the tools needed to start a music play activity [14].

D. Playing musical instrument using smartphones applications or electronic devices.

In this technological era, digital musical instruments are available and can be accessed through several electronic devices, such as smartphones, which grows rapidly in sales. According to the Ministry of Communications and Informatics (Kominfo), 63.3% of population in Indonesia had used smartphones in 2019 and the number is predicted to achieve 89% in 2025. Traditional musical instruments are played typically through an android-based application, because the vast majority of people in Indonesia use smartphones that are operating under Android operating system. Currently there are several android-based applications for musical instruments, covering modern instruments such as violin, guitar and keyboard and traditional musical instruments such as gondang, angklung, suling and kolintang. Most of these applications come with a design that is easy to understand which gives an easier way for children to operate them. There are also applications which allow users to choose different types of

musical instruments, and then seeing a description of the instrument such as pictures and their use. In the case that a young children were to use these application, parental supervision or assistance would strongly be required [15].

There are many advantages of playing musical instruments using applications for children including those in early childhood years. An obvious advantage is, it gives an efficient way to know various types of instruments. As noted previously, some applications provide several types of instruments in one application or one instrument that could produce several sounds with the help of technology. This feature enables children to experiment in combining multiple instruments or sounds. In addition, accessing this application is now relatively affordable for many parents. Another advantage is the mobility factor as smartphones are easy to carry and could be accessed in many locations or occasions with littler hassles

Having said that, there are also some major disadvantages of playing musical instruments through applications instead of playing the real physical instruments. First and foremost, the loss of excitement and experiment created by holding, hugging, blowing, tapping and hitting physical instruments. Each musical instruments have different physical shapes, weights, colour, materials and ways to play them and thus creates unique experiments. As described previously, there are also tangible benefits to children with regards to their motoric and sensory skills, eye and hand coordination and so on. Another major disadvantage is the lack of physical and emotional interaction between children while playing traditional musical instruments together. Many traditional songs would only possible with an orchestra of traditional musical instruments. One would argue that in the context of reaping the benefits of playing tradition musical instruments, the gold standard remains in the ability to play these instruments directly and not through digital devices or applications. This argument is amplified in the case of Indonesia that is rich in cultures and traditional musical instruments that present in these cultures.

IV. CONCLUSION

Early childhood education is a critical learning journey for children. It is the time where children develop their social, emotional, cognitive and physician needs. In the early childhood learning process, the roles and quality of teachers are crucial. Teachers are required to be creative for the sake of delivering interesting lesson to children. Musical instruments can have roles in creating a more interesting and effective early childhood learning process. In the context of Indonesia, it's even more promising due to the nation's abundance of unique regional cultures, where each culture tends to possess their own traditional musical which can be used in the early childhood learning process. Introducing local traditional musical instruments (including Batak musical instruments) as an educational tool also helps better in raising awareness of their own country's traditional culture and this would build a sense of nationalism and love of their own country. The rapid adoption of technology has given rise to the era of Internet of

Things, which allows new methods to play traditional musical instruments via software installed in an electronic devise such as smartphone. Whilst this has some benefits, there are tangible disadvantages compared to playing the instruments directly. Overall, the benefits of playing traditional musical instruments directly cannot be matched by smartphones or the likes. Nonetheless, the Covid-19 pandemic has accelerated the adoption of online learning process, thus, lead to a higher usage of smartphones. In this context, early childhood teachers need to be aware of both advantages and disadvantages of such situation and continue to ensure the learning process reach the optimal quality.

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