Abstract—Sensory Integration-based Picture Word Inductive Model (PWIM) is a modification of Emily Calhoun’s. Sensory integration-based PWIM is developed to help build early reading abilities of children with Learning Disabilities (LD). This model is based on Gestalt’s theory stating that a child’s thinking ability is still holistic. Piaget’s cognitive, Bruner, Vygotsky. Based on these theories, sensory integration-based PWIM is developed to help children with LD who have difficulty in reading. The steps of implementing the model are as follows: First, the child is invited to observe a picture; afterwards, the teacher tells a story. Once the child understands the story, the teacher writes it down on a paper or cardboard. Second, the story is made in a sentence using A, I, O, E, and U. Third, the child is guided to be able to pronounce each word in the story, read, and spell the words. Fourth, the story is broken down into words written in cards. Fifth, the child is asked to arrange the word cards. Sixth, the teacher shows the real objects described in the story. Seventh, the child is asked to hold. Eighth, the child is asked to recount his/her experience.

Keywords—PWIM; sensory integration; early reading

I. INTRODUCTION

Picture Word Inductive Model (PWIM) is an instructional model of reading developed by Emily Calhoun to build reading and writing ability and vocabulary in children (students) who are just entering the initial reading stage. This model is based on the aspects of child development according to John W. Santrock, which are as follows [1]: First, a child’s speech or language development begins with the production or voicing of sounds, meaningless sounds (babbling, chattering), followed by words, syllables, and simple sentences. This is followed by mentioning the names of objects around the child and imitating what is heard and said by others. Second is motor development. A child is at his/her high motor activity, so that s/he often moves, runs to and from, and strokes the objects s/he sees. Third is cognitive development. The thinking ability of elementary school children (7 - 11 years old) is only at the level of real or concrete objects; children’s thinking development should be stimulated by the environment in order to achieve the optimal thinking ability. Fourth, children’s social-emotional development demonstrates the ability to begin to have relationship with others.

Considering the theories on child development, the application of the Picture Word Inductive Model (PWIM) is as follows:

PWIM can also be used in learning English in China, as has been developed by Xuan Jiang from Florida International University in 2014 [2]. PWIM is based on initial literacy and is designed by Calhoun as a major component of the language art curriculum because it is closely linked to the specified and detailed steps [2]. In the first step of students’ language development, students identify objects, actions, and quality on large photos, mentioning words from the pictures and thus their use of vocabulary develops naturally [3]. The teacher draws a line from the relevant items in the pictures to the spelled words. Students then follow the teacher in spelling the words.

The second step is the process of learning to read and write. The teacher puts these words on large vocabulary cards and gives each student a smaller set of cards with the same words on them [3]. The last step of PWIM is called the read-and-write connection [3]. In this phase, the teacher makes up sentences out of the whole vocabulary and discusses how they can be made into paragraphs.

The nine instructional steps are as follows:

- Select a picture
- Have students identify what they see in the picture, mark the identified portion of the picture (make a line from the identified object or area, say the word, write the word, have students spell the word aloud and pronounce it)
- Read and review the picture chart seriously
- Ask students to read the words (using lines on the chart if necessary) and classify the words into various groups. Identify general concepts (e.g. first consonants, words, poems) to be emphasized with the whole class.
- Read and review the picture-word chart (pronounce the word, spell it, and say it again)
- Add a word if desired from the picture-word chart to the word bank
- Lead the students to create a title for the picture-word chart. Ask them to think about the information on the chart and what they want to say.
• Ask students to make sentences or paragraphs based on the picture-word chart. Ask students to classify sentences and model the arrangement of the sentences into a good paragraph.

• PWIM, according to Emily Colhoun, can also be used in special classes [4]. Given the diverse student populations, the emphasis should be on how to expand the reach to sub-populations with access to education that enables students to achieve. The first approach stresses on inclusion, ensuring that all types of students are not hindered from participating fully in the mainstream educational process and also ensures equal educational opportunities. The second approach emphasizes the making of varied programs to support the development of students who also have diverse characters such as different ethnic, social, economic or psychological characteristics. Specifically, for children who have learning difficulty or learning disabilities, they usually have difficulty in learning to read, write, and count; however, the present research focuses on overcoming learning difficulties to read first because reading will be the foundation in the learning process. Without reading skills, it will be difficult for the child to obtain further learning. In this regard, as Calhoun mentioned, PWIM can be applied to children with special needs such as learning disabilities as long as the model is modified. Considering that children with learning disabilities experience difficulties in their perception and memory, causing difficulties in learning such as learning to read, the Picture Word Inductive Model (PWIM) needs to be modified by integrating sensory systems on the basis of thinking that if the five senses are stimulated in learning, children will be enabled to learn in their full potential to function fully and develop optimally because the visual, auditory, tactile, kinesthetics, and gustatory senses are involved in the learning process. This is strengthened by Winkel who argued that the individual psychological process of learning will work properly when it involves the sensory system, so that information obtained in learning is stored in long term memory [5]. Colin Rose in Hernowo agreed, noting that involving all senses will make the individuals easily understand what they read [6].

Therefore, Picture Word Inductive Model (PWIM) is modified into PWIM based on sensory integration. Thus, the problem formulated in this research is whether sensory integration-based PWIM can overcome the learning difficulties of reading in children with learning disabilities and how the learning process takes place. The goal is to gain an understanding of how children with learning disabilities, specifically those who have difficulty in learning to read, can be assisted with sensory integration-based PWIM and how the teaching and learning process of early reading using sensory integration-based PWIM is implemented. The results of this research will be beneficial for children who have difficulty in learning to read and also for teachers who can hopefully be motivated to develop learning models and develop their pedagogic competence as well as being able to serve all students with their various backgrounds.

Sensory integration-based Picture Word Inductive Model (PWIM) is based on the following theories:

A. Piaget’s Theory of Cognitive Development

Primary school age children ranging in age from 7 to 11 years are in their operational concrete phase. Children at this age achieve the ability to think systematically about concrete objects.

B. Vygotsky’s Theory

Cognitive development is a process of constructing new knowledge simultaneously among all parties involved. The important concept of Vygotsky’s theory is the ZPD (Zone of Proximal Development), which is defined as immature functions or capabilities that are still in the process of maturation, thereby necessitating interaction between children and the environment; for example, in their learning, children should be given a lot of stimuli by the teacher. The more stimuli the children get when interacting with their environment, the more rapid the development of the children’s thinking function will be. Therefore, the highest cognitive process that develops when children are in school takes place when children interact with their teachers. The various pieces of knowledge presented meaningfully to the children will have a very valuable and beneficial impact.

C. Gestalt’s Learning Theory

Gestalt in German means total or totality. This learning theory foregrounds wholeness, unity, or integration in early reading, in which children are not introduced to letters but to sentences or syllables, instead. Gestalt’s main view is that a particular object or event will be viewed as an organized whole, or that basic order involves what is at the centre of observation and in opposition to the background of something meaningful. The meaning of an object or event lies in the whole form and not its parts, so the meaning of an object or event can be revealed when the object is observed as whole and not as the sum of its parts.

D. Bruner’s Theory

Bruner argues that children understand the world around them in the following three ways. There are enactive phase, iconic phase, and symbolic.

II. METHOD

The method used is case study with mixed methods approach, meaning combining qualitative and quantitative approaches. The data were obtained qualitatively when the researchers identified children with learning disabilities through classroom observation, while the quantitative data were obtained through pre-test to obtain reading ability score before being treated by Sensory Integration-based PWIM, and post-test after receiving treatment to find whether the problem in reading difficulty in children with learning disabilities can be overcome through Sensory Integration-based PWIM.

Research location was carried out in West Java, at Bandung City and Bandung Regency. The respondents were taken from Laboratories Elementary School and Cahaya Pelita Elementary School.
III. RESULTS AND DISCUSSION

The implementation of Sensory Integration-based PWIM (Picture Word Inductive Model) follows the following phases.

Phase 1: The teacher shows a picture to the child, and the child is then invited to observe the picture. After the child observes the picture, the teacher tells a story based on the picture in order to condition the child to concentrate and motivate him/her to learn. Children in general love stories or tales because stories are relevant to the characteristics of the child development. A child is at the imaginative, joyful, exciting, and playful time [1].

The pictures shown to the child include those of a kingdom or palace, a king, a picture of a forest in which there is a mango tree and wild deer. Based on the pictures, a story is made. The story goes like this: In a kingdom, lived a king who liked to hunt animals in the forest. One day, the King went hunting in the forest with his guards. The king was thirsty and so he asked his guards for a drink, but the guards forgot to bring drinking water for the King. One of the guards of the King was smart enough and came with the idea that since there were many trees in the forest, certainly there would be many fruits that could relieve the King’s thirst. The soldier was fortunate to find a mango tree that happened to be fruitful with a lot of fruits that were already ripe. Then immediately the guard climbed the mango tree and plucked the fruit. He offered the fruit to the King, and the King was very happy because his thirst was appeased by eating the mango fruit that was ripe and sweet.

Phase 2: After listening to the teacher’s story based on the pictures, the teacher asks questions about the story until the child is able to retell the tale or story him/herself. Subsequently, the teacher writes down the story on the board or on a duplex/HVS paper in such a way that all the words in the story use vowel “A”. The text of the story sounds like this “a da ra ja da ha ga ma kan mang ga”. The teacher reads the text and the child repeats what has been read by the teacher. Once the child is able to memorize the text of the story using vowel “A”, the text is replaced by other vowels, “I, E, O, and U”, and the same activity for the text with vowel “A” is repeated until all vowels are used [7].

Phase 3: Once the child has memorized the text of the story using vowels “A, I, E, O and U”, word cards are made on duplex paper. Words using vowel “A” are stored in a basket that reads A, and the same is true for words using other vowels “I, O, E, and U”; they are stored in their respective baskets. Then, once each basket containing the word cards in accordance with the vowels is ready, the child is required to arrange the word cards according to the text written on the HVS.duplex/board, starting from the vowels A, I, and so on, until all of the vowels are completed.

Phase 4: Once the child is able to arrange word cards according to the text of the story correctly, s/he is invited to play by arranging the word cards from baskets labelled “A, I, E, O, and U”; for example, the child is asked to take a card that reads “da” from basket “A” and a card saying “ri” from basket “I”, and then s/he is asked to put the two cards in pair and to read the word created from the pairing. This activity of pairing cards from basket “A” with those from basket “I” is repeated with other cards from the rest of the baskets (O, E, and U) until the child is skilled and able to read the words correctly [5].

Phase 5: The child is next invited to observe the types of fruits. Because the story tells about mangoes, in order to be relevant to the story, the child is introduced to types of fruits, including papaya, orange, starfruit, watermelon, sapodilla, salak, tomato, and pineapple. After the child observes the fruits, s/he is asked to hold, touch, and mention the fruits. For example, first the child observes a sapodilla, and the teacher then labels the fruit. The child and the teacher move to observe other fruits, label the fruits, and so on and so forth until all the fruits are observed and labelled. This activity is carried out repeatedly. Repetition in learning is necessary because children with learning disabilities are characterized by weak memory and perception as shown by Robert E. Slavin [8].

Phase 6: After the child observes, feels, pronounces, and even tastes the fruits, the teacher asks the child to describe the characteristics of the fruits. Take for example, the orange. The child is asked to describe that the orange is yellow in colour, the skin is smooth, the taste is sweet, and the smell is stinging. The teacher writes down the child’s description, reads it, and the child repeats it, and this series of activities is repeated until the child is able to read. This corresponds to Colin Rose’s argument that when reading involves the entire senses, it will be easier for children to understand what they read [6].

IV. CONCLUSIONS

Picture Word Inductive Model (PWIM) is developed by Emily Colhoun to build reading and writing skills in children who are just entering the early reading stage and is used in the general class. The model can also be used in special classes for children who have learning difficulties, especially in reading, given that the model is modified in its function to involve stimuli of senses in the teaching and learning, including visual, auditory, tactile, mechanical, and gustatory senses with the following steps. First: Stimulating visual, auditory, tactile sensory systems through observing pictures and listening to a story based on pictures. Second: Stimulating tactile and kinesthetics senses by arranging the word cards according to the order in the story and then the child reads the story using
the cards. Third: Stimulating the taste with a repeated series of activities, but using different objects, namely using fruits along with the pictures and writings. The child is then asked to take one of the fruits and match it with the picture and the writing. The child is subsequently asked to read the writing, and this activity is repeated with other types of fruit. Fourth: Stimulating tactile, kinesthetic, gustatory, visual, and auditory senses, by taking one of the fruits. The child continues to observe, stroke, and eat (with the gustatory sense) and then create a sentence based on the fruit he observes, feels, and eats, with the teacher writing the sentence made by the child. Thus, the teacher can develop and facilitate learning for all children (learners) with diverse potentials by using or applying a learning model or method tailored to the students’ backgrounds and needs.

REFERENCES