

The Dual-Coding Theory and Digital Media: The Effect of Nursery Rhymes on Teaching Vocabulary

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Abstract

Most of the vocabulary in English has differences in written and spoken form, then it also takes time for the learners to recognize and memorize the new vocabularies that they have learned before they implement it in their conversation. The dual-coding theory believes when verbal and non-verbal stimuli are connected, it brings a deeper understanding and better imaging of certain things. The objectives of this study are to find out whether the use of nursery rhymes is significantly effective or not, and how effective the use of nursery rhymes is for vocabulary teaching processes based on the perspective of the dual-coding theory and the aspect of vocabulary knowledge to the elementary students. The participants of this study are 64 of the Year-3 students at MI Ushuluddin Singkawang in 2022/2023 of academic year divided into two groups, control and experimental group. The data were taken from the students' pretest and posttest results and tools to measure the data were thirty numbers of short answer questions. The findings show nursery rhymes are significantly effective for the vocabulary teaching processes to the elementary students. Nursery rhymes not only run mechanically but also activate the students' experiences, emotions, and thoughts through the process of repeating, reciting, then practicing related to the aspect of form, meaning, and use in vocabulary knowledge. All of these processes in the classroom bring a better recall for them specifically related to vocabulary learning.

Keywords: the dual-coding theory, digital media, nursery rhymes, teaching vocabulary

INTRODUCTION

The formal education in Singkawang, one of the cities in West Kalimantan, puts English as one of the main subjects which have to be taught at school. Starting from the lower level to the highest level of education, English became the second language in this city. Mostly, the students in Singkawang use English only during the English class, they will talk in their mother tongue or vernacular (Malay) after the class ends. MI Ushuluddin is one of the private Islamic elementary schools in Singkawang that brings English as one of the subjects from the first grade to the sixth grade. This school has 737 students divided into 23 learning groups from Years 1 to 6. English is a local subject at this school and it is taught by the English teacher. For young learners at MI Ushuluddin of Singkawang, English is known as a unique subject. It comes with a certain word and its spelling which usually has a big difference in pronunciation compared to its written form. Most of these young learners are able to pronounce the vocabulary without knowing how to write the right pattern of it.

Being an English teacher in this digital age takes advantages and disadvantages at the same time. The digital age is marked by the situation where society functions as a whole in the world that is connected through digital and it forces drastic changes in all domains of human's life (Saykili, 2019). Digital learners also have several characteristics as follows: they are growing up with technology, they are more comfortable with multitasking while browsing digital libraries, reliant on graphics, and they are growing faster by gratification (Şahin Kızıl, 2017). The learner in the digital age is also closer to the use of digital media. Media in general can be tools, channels, platforms, and strategies used by the creator to produce and share information related to the things happening around us (Lindgren, 2017). The terms of 'media' were divided into two: new media and old media. The old media is used to define the traditional mass media such as television, newspaper, or radio, while the new media describes the information and communication technologies based on digital code (Delfanti & Arvidsson, 2019). Digital media affects all human living environments including the education field. The teachers who implement digital media in the classroom can provide materials more efficiently and it will increase the teaching opportunities as well as the quality of education that create a modern educational atmosphere (Jobirovich, 2021). There are several benefits of bringing digital media into education as follows: the learners are not only browsing the materials on the Internet but also making knowledge more practical for them, it creates the opportunity for the learners to learn and collaborate with their friends through the ideas sharing and problem solving, increasing the learners' interest and motivation, providing unlimited learning resources, the information will always update instantly, and it leads the learners to become dependent and creative (Shatri, 2020).

Nursery rhymes are traditional songs or poetry written in simple sentences by unidentified poets that serve young children to listen, enjoy, and even sing the songs (De Mello et al., 2022). Nursery rhymes could also be defined as short poems or songs for little children and normally found in local communities (Saibauthong & Yimwilai, 2022). Nursery rhymes have no general form that must be written consistently, they might be in a short or long version but most of them are strong rhythm musicals that are easier to be remembered (Sayakhan & Bradley, 2019). Nursery rhyme not only provides songs for entertaining purposes but also enhances language practice and positively affects the children's memorization and vocabulary (Kuśnierek cited in Long & Mustafa, 2020). For

example, the rhyme 'Head, shoulders, knees, and toes' does not only bring a simple song with certain gestures to the human body while singing the song, but it also makes the listener easily to understand the parts of the human body and its vocabulary in a second language while in this case English is considered as the L2. There are many channels that can be found on Youtube which serve nursery rhymes. One of the famous Youtube channels for kids is *Cocomelon*. It has the largest number of subscribers at the second position on Youtube in 2019, and in 2022 it has 132 million subscribers with 124 million impressions (Anggraini et al., 2022).

Learning English through rhymes is also needed as the learners start to learn a different language from their mother tongue. Vocabulary can be defined as the group of words that must be recognized in order to communicate effectively using a certain language while the words are divided into words in speaking or expressive vocabulary and words in listening or receptive vocabulary (Agustin & Ayu, 2021). Vocabulary is becoming the basic tool of communication where the users are using it to express their feelings, opinions, and ideas (Dakhi & Fitria, 2019). There are nine aspects of vocabulary knowledge derived from three main parts which are form, meaning, and use discussed by Nation (2020) as follow: spoken, written, word parts, form and meaning, concept and referents, associations, grammatical functions, collocation, and constraints on use. Linse cited in Alqahtani (2015) states that the important aspect of language development can be seen in the learners' vocabulary development during the learning processes. It is almost impossible to learn a language without knowing its vocabulary or words. Presenting Youtube videos that include songs and funny figures singing together using the English language hopefully can help them to know and memorize as much vocabulary as possible in a second language. Since the younger students are more interested in full-color videos and ear catching audios, the use of digital media as the *Cocomelon* Youtube Channel that is chosen for this study, hopefully, lead to the answer of how digital media can affect the students' vocabulary learning process in the second language classroom atmosphere.

There are studies on nursery rhymes to teach vocabulary in elementary schools. All the research conducted by different researchers proved that nursery rhymes were effective. Not only to motivate the learners to learn the language, but nursery rhymes also build a platform to encourage them to be more active while listening to the rhymes (De Mello et al., 2022; Nurhudayah, 2018). Nursery rhymes were also positively impacting the learners from primary to junior high school students to improve their vocabulary knowledge and their different backgrounds of the learners who came from different grades were not affected by their vocabulary mastery (Saibauthong & Yimwilai, 2022). It indicates that nursery rhymes can be used for all grades of educational background in formal or informal institutions.

Based on the previous similar research done in teaching vocabulary by using nursery rhymes, this study has a different target of study where the previous studies were taken from junior high school students and preschool teachers, then this research takes elementary students as the participants of the study. The other gaps come from the last research that compared two different grades (third and fourth), while this study takes the same grade but divides the class into experimental and control groups. Then, the last gap is coming from the theory used to cover the analyzing data and discussion section of the research.

Vocabulary knowledge is becoming the main foundation of foreign language learning (Kassim, 2018). There is a need to help the learners to master the English vocabulary as their foreign language beside their mother tongue in order to create better and meaningful communication in this digital age where all daily activities are usually connected to the digital media. Young learners in elementary school are including into a golden phase to master vocabulary knowledge. The present research uses the dual-coding theory as the foundation of the research that emphasizes the verbal and non-verbal stimuli from the nursery rhymes. That is why this study needed to be conducted to look for whether the use of nursery rhymes is significantly effective or not for vocabulary teaching processes to the younger students in L2 specifically at MI Ushuluddin Singkawang as one of the private Islamic elementary schools in West Kalimantan, and to find out how effective the use of nursery rhymes is for the vocabulary teaching processes based on the perspective of the dual-coding theory and the aspect of vocabulary knowledge to the elementary students at MI Ushuluddin Singkawang.

METHOD

This study belongs to descriptive quantitative research with a quasi-experimental design, specifically the Nonequivalent Control Group Design which involves two groups of classes. Quasi-experiments include assignments, but not the random assignment of participants to groups because randomly assigning students to the two groups would disrupt classroom learning (Creswell, 2012). Quantitative research examines the relationship among the variables which can be measured and analyzed by using statistical procedures in order to test the objective theories (Creswell, 2012).

The present research covers two variables. They are independent variable (X) and dependent variable (Y). The former refers to a variable that influences or affects an outcome or dependent variable (Creswell, 2014), the latter refers to an attribute or characteristic that is dependent on or influenced by the independent variable labeled as the outcome, effect, or criterion (Creswell, 2014). The present research, the independent variable is the nursery rhyme, and the dependent variable is the elementary students who learn vocabulary. Population of the present research are the Year-3 students at MI Ushuluddin Singkawang in the academic year of 2022/2023 divided into 4 learning groups with a total number of 131 students, while the sample involves two learning groups, learning in Year 3. The first group is treated as the experimental group (32 students) and the other as the control group (32 students).

The techniques used to collect the data were measurement and observation. The researcher used the achievement test as the instrument to collect the data of this research. According to Downie in Narula & Sindhwani (2016), achievement tests include all the tests that measure an individual's attainment after a period of the learning process. The tools to measure the data in the form of achievement were short answer questions. These questions were applied to assess the students' achievement before the treatment given to them (called 'pretest') and after the treatment (called 'posttest'). The achievement tests prepared for the pretest and posttest consist of 30 questions divided into three categories: 10 questions naming the images with the English word, 10 questions translating English words into Indonesian meanings, and 10 questions writing the English vocabulary based on the Indonesian words. All the questions included six different learning topics which have been discussed during the research meeting.

FINDINGS AND DISCUSSION

The Effectiveness of Nursery Rhymes for Vocabulary Teaching

The dual-coding theory sees a phenomenon when information is transmitted through verbal (speech) and non-verbal (visual) at the same time and it will affect the deeper comprehension and understanding about new vocabulary during the language learning process (Wong & Samudra, 2021). In this research, the dual-coding theory happens when the students or the sample watch the nursery rhymes videos as the non-verbal stimuli for them and at the same time they also start to hear and process the lyrics written on the screen while the video is played as the verbal stimuli.

The effectiveness of nursery rhymes for vocabulary teaching which is being implemented in the experimental class for several meetings are proven from the comparison of the students' posttest result with the posttest result from the controlled class. The researcher divides the posttest questions into three types as the combination of two stimuli in the dual-coding theory, they are verbal stimuli (in written form) and non-verbal stimuli (picture). The differentiation aims to see how effective nursery rhymes affect the students' vocabulary in verbal and non-verbal types of tests. The detailed comparison is proceeded by using an independent sample t test in SPSS version 23 and the researcher inputs the students' score for different question types separately.

Making the decision result based on the independent t test are still in two ways; from the comparison of t_{value} and t_{table} , then the Sig. (2-tailed) score with Significant level (α) 0,05. The first comparison states that H_0 is rejected if $t_{\text{value}} > t_{\text{table}}$, and the second comparison claims if Sig. (2-tailed) score $<$ Significant level (α) 0,05 (Anwar, 2009). Since the data are taken from the posttest results of the experimental and controlled class, the $df = N - 2 = (32+32) - 2 = 62$. The t_{table} for df 62 = 1,998.

The independent t test result will be explained in three parts. It will start from the result of question type A (Picture to English word, number 1 to 10), type B (English to Indonesian, number 11 to 20), and type C (Indonesian to English, number 21 to 30). Questions type A consists of ten questions starting from number 1 to 10. The researcher puts ten different pictures from six topics which are being discussed during the second until the seventh meeting of the research. The students have to write the English word based on the picture they see on the posttest worksheet. The pictures are presented in full-color and related to what they have watched on the nursery rhymes videos. The below table presents the independent t test for the results taken from ten questions of type A.

Table 1. Independent T Test for Question Type A

		t-test for Equality of Means					95% Confidence Interval of the Difference	
		t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Students' Scores for Questions Type A	Equal variances assumed	5,162	62	,000	2,344	,454	1,436	3,251
	Equal variances not assumed	5,162	58,947	,000	2,344	,454	1,435	3,252

Table 1 shows the t_{value} is 5,162 and the Sig. (2-tailed) is 0,000. It means that $t_{\text{value}} > t_{\text{table}}(62; 1,998)$, and Sig. (2-tailed) $<$ Sig. Level(α)0,05. These two comparison results prove that there

is a significant difference from the experimental and controlled class where pictures shown in the worksheet remind their brain about the imagination of certain things related to what they have been watching on nursery rhymes videos. Mean difference with score 2,344 is also proving that there is significant difference from the experimental and controlled class posttest results.

Questions type B consists of ten questions starting from number 11 to 20. The researcher asks the students to write the meaning (in Indonesia) based on the English vocabulary that they see on the posttest worksheet. The below table presents the independent *t* test for the results taken from ten questions of type B.

Table 2. Independent T Test for Question Type B

		t-test for Equality of Means					95% Confidence Interval of the Difference	
		t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Students' Scores for Questions Type B	Equal variances assumed	3,630	62	,001	1,688	,465	,758	2,617
	Equal variances not assumed	3,630	61,032	,001	1,688	,465	,758	2,617

The above table shows the t_{value} is 3,630 and the Sig. (2-tailed) is 0,001. It means that $t_{\text{value}} > t_{\text{table}(62; 1,998)}$, and Sig. (2-tailed) $<$ Sig. Level $(\alpha)_{0,05}$. This comparison is also proving that there is significant difference from the experimental and controlled class where the English vocabulary appears from nursery rhymes videos will help them to memorize what they have heard or seen on the lyrics video. Mean difference with score 1,688 also represents that there is significant difference from the experimental and controlled class posttest results.

Questions type C as the last type of research question consists of ten questions starting from number 21 to 30. The researcher puts ten Indonesian vocabulary related to the topic and the students have to write the English word based on its Indonesian version as what they see on the posttest worksheet. The below table presents the independent *t* test for the results taken from ten questions of type C.

Table 3. Independent T Test for Question Type C

		t-test for Equality of Means					95% Confidence Interval of the Difference	
		t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Students' Scores for Questions Type C	Equal variances assumed	2,850	62	,006	1,406	,493	,420	2,392
	Equal variances not assumed	2,850	54,507	,006	1,406	,493	,417	2,395

Table 3 shows the t_{value} is 2,850 and the Sig. (2-tailed) is 0,006. It means that $t_{\text{value}} > t_{\text{table}(62; 1,998)}$, and Sig. (2-tailed) $<$ Sig. Level $(\alpha)_{0,05}$. These two comparison results prove that there is also significant difference from the experimental and controlled class where Indonesia words as their mother tongue appear on the worksheet, they started to rememorize its English vocabulary by connecting on what they have seen on nursery rhymes' lyrics. Mean difference with score 1,406 proves that there is significant difference from the experimental and controlled class posttest results.

The summary of all independent t test outputs as the answer for the second research question on how effective is the use of nursery rhymes for the vocabulary teaching process based on the perspective of the dual-coding theory to the elementary students at MI Ushuluddin Singkawang describes in Table 4.

Table 4. Summary of Independent T Test Results

Students' Scores	Types of Question Items	t-test for Equality of Means					
		t	df	Sig. (2-tailed)	Mean Difference	Mean	
						\bar{x}_{exp}	\bar{x}_{cont}
	All Items (30 Questions)	4,669	62	,000	17,469	77,00	59,53
	10 Items from Question Type A	5,162	62	,000	2,344	7,97	5,63
	10 Items from Question Type B	3,630	62	,001	1,688	7,59	5,91
	10 Items from Question Type C	2,850	62	,006	1,406	7,53	6,13

The 't' column shows the t_{value} for all of the outputs which is higher than t_{table} for $df = 62; 1,998$. The Sig. (2-tailed) score from all items and items type A, B, and C are also smaller than the Significant Level ($\alpha = 0,05$). Then, Table 4 is also presenting mean scores and its difference in the last three columns of the table. The $t_{value} > t_{table}$ and Sig. (2-tailed) score $< (\alpha) 0,05$ become the proof that nursery rhymes are affecting and effective for the vocabulary teaching process for elementary students at MI Ushuluddin Singkawang. The other proof of nursery rhyme's effectiveness is also related to several aspects involved in vocabulary teaching processes during the observation as the answer of the research question number two about how effective is the use of nursery rhymes based on the aspect of vocabulary knowledge to elementary students at MI Ushuluddin Singkawang.

The observation checklist shows that most of the students are interested while the teacher plays the nursery rhymes and some of them are trying to sing the rhymes by themselves. Several students are also starting to sing even when the first time the teacher plays the video, it might be in a certain situation where they have recognized the rhymes before or they have heard it somewhere. It is suitable with what Kenney states in Meganathan (2019) that nursery rhymes not only run mechanically but also activate the students' experiences, emotions, and thoughts through the process of repeating, reciting, then practicing. These processes are also suitable with the past research done by Kanellopuolou et. al., (2019) that the students would engage and interact actively if the relevant teaching medium is suitable for their characters.

The above situations show the aspect of form in vocabulary knowledge that involves the spoken, written, and word parts (Nation, 2020). The spoken aspect firstly occurred while the students started to sing the lyrics of nursery rhymes after they built their written aspect which is paying attention to the videos and lyrics as the combination of verbal and non-verbal stimuli. When the students are able to mention the English word from several things based on the video as what is in list number 5 on the observation checklist, they are trying to implement and proceed parts of word that have to be occurred when they want to express certain vocabulary from their L1, with or without the determiner or affixes as the example. The other aspect of vocabulary knowledge that occurs in this research during the observation is in the meaning aspect. During the second to the seventh meeting, the students are able to translate and imagine the word related to some pictures or figures from the nursery rhymes videos and even when the teacher asked

them to another things around them, they are able to think the appropriate meaning and it is in lined with the aspect of connecting form and meaning (Nation, 2020).

Nursery rhymes also activate the students five senses, it can be seen when the students are likely to imitate the video movements during the rhymes are played. It positively affects the students' memorization and vocabulary while they create certain gestures and connect it into the things around them, for example when they sing the body parts song and point out their own body parts at the same time (Long & Mustafa, 2020). This research finding is also parallel with what Morett (2019) found that using gesture and image would have a better recall for the learners than using the gesture only. Meanwhile, in this research, the students are actively use their gesture, videos, and also the vocabulary itself. Then, they tend to be easier to remember what they have said, they pointed out, and they formed. This finding also shows the aspect of use in vocabulary knowledge where the students are able to recognize the words that might be occurred when they talked about their own body, their own house, or their daily activities.

The class atmosphere is more pleasing for students and the teacher since nursery rhymes serve colorful and interesting videos or rhymes which are suitable to fulfill the younger learners' characteristics; easily interested in movement and attractive melody (Brown cited in Syakur, 2020). The previous research conducted by Syafril and Kurniawati (2021) has proven that the research media they used during conducting their research was also more helpful and interesting for the learners. But, the difference is they use the PPT Audio and this research uses nursery rhymes as the teaching medium. Even though it is different, it has the same characteristic that is serving the verbal and non-verbal stimuli at the same time as the implementation of the dual-coding theory. The experimental class tends to be more active during the lesson hours when they sing, they imitate, and they answer the teacher's question related to the vocabulary that they have sung together from the rhyme. Then, the experimental class is focused on the students' oriented, but, as the opposite from the controlled class, is more teacher centered. Even though some students in the controlled class were also being active during the question-answer session, most of them just passively waited for the teacher's explanation on the topic being discussed at that time.

CONCLUSION

There are five statistical steps conducted during the analyzing data processes. From the finding of this research, it can be concluded that all $t_{\text{value}} > t_{\text{table}}(df=62; 1,998)$ and Sig. 2-tailed $< \alpha 0,05$, then it can be stated that there is a difference between independent variables which came from the posttest results of the experimental and controlled class, then it can be concluded that nursery rhymes are significantly effective for vocabulary teaching processes to the elementary students at MI Ushuluddin Singkawang.

Nursery rhymes are also effective in several aspects of vocabulary knowledge. From the nine aspects of vocabulary knowledge, in this research, the researcher found that nursery rhymes are effective in activating five aspects. In the form aspect, nursery rhymes are effective in involving the aspect of spoken, written, and word parts. Nursery rhymes have also involved the aspect of meaning in connecting the word form and its meaning with the word usage in a certain situation in line with the aspect of use from the vocabulary knowledge.

Based on the above research findings and conclusion, the researcher proposes some suggestions are formed as follows: a) to the other researchers who are interested in conducting quasi-experimental research by implementing rhymes in a classroom should make sure that the audio used is not disturbing the other classes during the lesson hour, but it must be clearly spread around the research class only, b) to the English teacher who teaches younger learners (elementary or kindergarten) should better use digital media such as nursery rhymes while conducting a teaching and learning process in the classroom, so the students hopefully enjoy and be interested in following the lesson when they might activate all the aspects in vocabulary knowledge at the same time, and c) to the parents of young learners, specifically those who have children at elementary level, should play nursery rhymes when their children are having a free time at home, so it hopefully helps them become more familiar with the other language besides their own vernacular.

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