

Mind Mapping Method Based on Information Scheme:

Alternative for students with reading comprehension difficulties

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Abstract—This research offers an alternative reading comprehension learning model to overcome students' difficulties in understanding the text content by implementing mind mapping method based on information scheme. This research uses an experiment single subject method with reversal design (A-B-A-B) which provides repetition of treatment to the research subject. The subject of this study are two students of class eleventh senior high school who had reading comprehension difficulties. The students have the obstacle to understanding the referent of the sentence and the content of the text. The results showed that students' reading comprehension skills had increased. This is indicated by the accuracy of determining the referents of the pronouns in the sentence; accuracy of determining information in the text; and the accuracy of determining the main idea of the text.

Keywords—reading comprehension; mind mapping; information scheme

I. INTRODUCTION

In this global era, reading comprehension skills are very important to be mastered by students as the main key to acquiring knowledge. In adolescents or high school students, learning materials are generally presented in the form of text or reading [1,2]. The ability to access text is very important to support cross-curriculum learning and communication through writing with increasing age; thus, the difficulty of reading comprehension is a considerable obstacle to educational attainment [3]. Students who are not literate or have reading difficulties will face excessive obstacles in following the learning process.

Reading comprehension related to cognitive process. Creativity in using method and creating reading learning media base on how the brain works can help students with reading difficulties to improve understanding and retention of the text content read. Presentation of text content in the form of mind maps will be more visually interesting because it displays connecting lines between concepts, colors and representative images. Mind maps can hone creative thinking skills because they require all the skills commonly associated with creativity, especially imagination, idea association and flexibility [4]. In addition, the display of key points in the text that form certain

features in the mind map can make it easier for students to understand content and information in the text more quickly.

Research on comprehension reading skills has been widely carried out. Some of them are as follows. Liu, et al. produced a study concluded that the use of mind mapping in reading comprehension learning was also influenced by the origin of the learning country [5]. Swanson, et al. shows the impact of the content of text content on students' reading interest and ability to have difficulty reading [6]. Ardasheva, et al. conducted a study that produced findings that there was a visual impact on the interest in reading comprehension in adolescents [7]. Morfidi, et al. produced research findings that the use of mapping concepts successfully improved students' ability to read difficulties in understanding the content of exposition texts [8]. Based on some of these studies implies a relationship between reading comprehension skills for students having difficulty reading with the readiness to implement reading learning such as the content of the material, media, and learning methods. Through this study presented the ability to read comprehension for students having difficulty reading as research subjects along with alternative solutions to improve students' reading ability. The solution offered as a reference for students with reading difficulties is teaching materials and learning methods for reading mind-based maps. The teaching materials are modified so that they are in line with the way the brain works and can spur student involvement in reading comprehension.

II. THEORETICAL FOUNDATION

A. Understanding Reading Comprehension

Reading comprehension is a complex activity. This is because it involves the skills of processing and interpreting information in abstract text so that it becomes concretely and logically accepted by the brain. Reading comprehension is a process that simultaneously extracts and builds meaning through interaction and involvement with written language, namely the integration of the meaning of words, sentences, and paragraphs [9,10]. Meanwhile, understanding is built by involving social and cultural contexts so that readers can use different ways of understanding because they utilize various interests, attitudes, schemes, and prior knowledge [11,12]. In

reading comprehension there are at least three main things, namely: knowledge and experience that has been possessed, the process of connecting knowledge and experience with the text to be read, the process of acquiring meaning actively in accordance with the views held.

The cognitive process of reading comprehension is roughly divided into two categories: (1) a lower level process that involves translating written code into meaningful language units and, (2) a higher level process that involves combining these units into representations mental meaningful and coherent [13]. Reading comprehension is intended to allow readers not only to recognize or know graphic symbols or symbols, but also to be able to understand the content of the reading in an explicit, implied, and highlighted manner as information sources.

B. Reading Comprehension Difficulties

Reading learning difficulties are one of the learning difficulties, namely obstacles for students in learning. Learning difficulties are a general term for various types of difficulties in listening, speaking, reading, writing, and arithmetic [14,15]. Students with reading comprehension difficulties have difficulty in the decoding process, process language grammar, interpret information in text or understand story structure, and metacognitive thinking difficulties [16,17]. Learning difficulties in reading comprehension referred to in this study are the learning difficulties experienced by students in terms of processing information and synthesizing text content read. In this case, students have difficulty understanding ideas in discourse/text.

C. Learning Reading Comprehension Using Mind Mapping Method Based on Information Schemes

Learning to read in Indonesian at the secondary school level always uses the text as a medium and aims to achieve its abilities. Students are expected to understand the text well. There are several aspects of reading that need to be assessed in learning as stated by Horner below [18]: (1) using a variety of strategies, including accurate text decoding, to be read to get meaning; (2) understanding, describing, selecting or retrieving information, events or ideas from the text and using quotations and references to the text; (3) conclude or interpret information, events or ideas from the text; (4) comments about the structure and organization of the text, including grammatical features and presentations at the text level; (5) identify and comment on the use of the author's language, including grammatical and literary features at the level of words and sentences; (6) identify and comment on the goals and point of view of the author and the effect of the text on the reader; (7) linking texts with their social, cultural and historical contexts and literary traditions.

Learning that uses mind maps can make the learning atmosphere meaningful because new knowledge or information is more easily absorbed by students and helps students to summarize the subject matter. The mind map method aims to build students' knowledge in systematic learning, namely as a technique to increase students' knowledge in mastering the concepts of a subject matter [4,19,20]. The reading stage of

learning with mind mapping method based on information schemes is as follows: (1) record the main ideas according to the text read from the results of the text read with the help of an information scheme; (2) organizing/sorting important information from text content and information with the help of information schemes; (3) prepare the main branches then search for keywords with the help of information schemes. (4) communicate the results of the mind map design; (5) collecting mind map design results; (6) evaluate the results of mind map design.

The things that can be done in learning to measure reading comprehension skills as follows: (1) making predictions prior to reading; (2) revising predictions while reading, based on new information; (3) considering (thinking about) information read previously; (4) making inferences; (5) drawing conclusions; (6) making judgments; (7) visualizing or creating mental images paraphrasing; (8) summarizing; (9) generating questions; (10) reasoning about what was read; (11) monitoring understanding; (12) using context to figure out difficult words; (13) Rereading challenging sections; (14) Looking at illustrations to aid comprehension [21].

Information scheme as a learning media in this paper uses the concept of mind maps to help create meaningful reading comprehension learning. This information scheme contains a mapping of types of information based on specific fields which include themes in the fields of health, social, culture, technology, art, literature, and natural phenomena. This type of information is derived again by grouping other types of information similar to the information area. For example, information in the health sector includes sports themes, healthy lifestyles, diseases, medicines, etc. Next, a number of texts will be presented related to the information field along with guidelines for reading text based on information maps. This is manifested in the form of arrows and several question sentences that show the relationship between types of information. Then, students follow the instructions on the information map by looking at the arrows and guide questions presented.

III. RESEARCH METHODOLOGY

The research design used in this study is single subject research (SSR). Single Subject Research (SSR) is an experimental research conducted to find out how much influence of a treatment (treatment) is given repeatedly to a subject within a certain time [22-24]. In this study, the research design used was reversal design (A-B-A-B) because the design showed a strong control [23]. Therefore, internal validity is increased so that the results of the study which show the functional relationship between dependent and free variables are more convincing. By comparing the two baseline conditions before and after the intervention the belief in the influence of the intervention was more quickly convinced.

A	B	A	B
Baseline measure	Treatment condition	Baseline measure	Treatment condition

Fig. 1. A-B-A-B desain.

The baseline-1 (A-1) is the average occurrence of behavior in a certain period after being measured through observation. Intervention-1 (B-1) is a condition of giving treatment repeatedly until it reaches a clear trend and level, the treatment will be given after the data has stabilized at baseline 1 (A1), the intervention provided is learning using mind mapping method based on information scheme. Baseline-2 (A2) is a condition of students' ability to read comprehension after being given intervention. In this observation, measurements were taken using students' reading comprehension tests. Intervention-2 (B-2) is carried out the same as intervention-1 (B1), namely learning by using an information-based mind map method.

The independent variable used is the use of mind map method based on information map teaching materials. Meanwhile, the dependent variable in this study is the ability to read comprehension in students having difficulty reading. The main subjects of this study were two students of class XI SMAN 1 Kalijati (Senior High School) who had difficulty reading comprehension. The student has obstacles in understanding and absorbing the core of the text that is read. When reading aloud, this group of students has not been skilled in determining the sentence interval.

IV. RESULTS AND DISCUSSION

A. Baseline-1

Baseline-1 (A-1) was carried out for three times (three meetings) until the data obtained was stable. One meeting lasts for 90 minutes. This phase is done to see the subject's initial ability before intervention is given. Based on observations at baseline-1, information was obtained that subjects 1 and 2 had not mastered the accuracy of pauses in loud reading. This implies that subjects 1 and 2 do not understand the content of the text being read, as evidenced by students' answers to questions about the text content. The following is a pause transcription in reading a text entitled Mass Demonstration on a class XI textbook that was carried out by a research subject.

Akhir-akhir/ ini demsonstrasi/ kerap/ terjadi hampir di setiap waktu dan terjadi di berbagai tempat/. Bahkan,/ demonstrasi sudah menjadi fenomena/ yang lumrah di tengah-tengah/ masyarakat kita// Menanggapi fenomena/ tersebut,/ seorang kepala daerah menyatakan bahwa penyebab/ demonstrasi dan anarkisme/ tidak lain adalah faktor laparnya/ masyarakat// Tentu saja komentar/ tersebut menyulut reaksi mahasiswa.// (Subject-1).

Akhir-akhir ini demsonstrasi/ kerap terjadi/ hampir di setiap waktu/ dan terjadi di berbagai tempat/. Bahkan,/ demonstrasi/ sudah menjadi fenomena/ yang lumrah di tengah-tengah/ masyarakat kita// Menanggapi fenomena/ tersebut,/ seorang kepala daerah menyatakan bahwa penyebab/ demonstrasi dan anarkisme/ tidak lain adalah faktor laparnya/ masyarakat// Tentu/ saja komentar/ tersebut menyulut reaksi mahasiswa.// (Subject-2).

In addition, in this phase it is also known that the research subject has difficulty showing references from pronouns and indications in the text, for example, references from the pronoun <kita>, <tersebut>, <nya>. Based on the observations of the silent reading activity carried out by the research

subjects, it was found that in the subject-1 the silent reading activity carried out still involved the activities of the mouth muttering and using hand gestures to designate the sentence in the text. This makes reading activity slow. Meanwhile, in Sub-2 subjects silent reading uses lip movement but is silent. Both subject-1 and subject-2 have difficulty concluding the core information presented in the text they read.

B. Treatment-1

In this phase, research subjects were given treatment by applying reading learning using mind mapping method base on information scheme. The learning steps taken are presented in the following table 1.

TABLE I. LEARNING STEPS OF TREATMENT-1

No.	Stage	Student Activity	Teacher Activity
1	Record the main ideas according to the text read from the results of the text read with the help of an information scheme.	Listening to the learning objectives that the facilitator communicates and preparing a paper to design the main topic of mind maps.	Explain learning objectives Helping students learn to sort information (if needed)
2	Organize/sort important information from text content and information with the help of information schemes.	Design the main branch on the mind map.	Helping students learn (if needed) Helping students learn to sort information (if needed)
3	Prepare the main branches then search for keywords with the help of information schemes.	Find relevant keywords	Ask questions related to students' understanding of some words
4	Communicate the results of the mind map design.	Communicate the results of the mind map design	Ask questions related to students' understanding of the text
5	Collect mind map design results.	Collect mind map design results	Check the results of mind map design
6	Evaluate the results of mind map design.	Reflection and evaluation of mind map design products	Perform reflection and evaluation of mind map design products

Table 1 shows that the mind map method is used to produce, visualize, structure, and classify ideas, and as an aid to learning and managing information, solving problems, making decisions related to the content and information in the text that students read. This is intended to improve students' reading comprehension skills who have difficulty reading. Meanwhile, the information scheme is used as a guide for students and teachers in initiating and starting reading comprehension activities and organizing reading results so that student's/research subjects can conclude the text content correctly. The learning steps as described are carried out continuously and repeatedly during the treatment-1 phase.

In the treatment-1 phase, information was obtained about improving the ability to read comprehension of research subjects. This increase was marked by habituation of reading comprehension activities, namely utilizing eye movements (fixation). In addition, the subject begins to understand the reference from the pronoun and the indicator in the text that is read. Subjects can indicate what is meant in the reference to the text. One of them is seen in the ability of subject-1 and 2 in determining the reference to the word <ini> in the following text. Subject-1 explains the reference to the word <ini> as a sign of an earthquake event. Subject-2 explained the reference to this word <ini> in more detail as a sign of the earthquake that occurred in Yogyakarta, Saturday, May 27, 2006.

Gempa bumi melanda wilayah bagian selatan Daerah Istimewa Yogyakarta, Sabtu, 27 Mei 2006 pukul 05.54 WIB. Kekuatan gempa bumi tercatat 6,2 skala Richter pada kedalaman 17,1 km. Pusat gempa terletak pada posisi ± 25 km barat daya Kota Yogyakarta.

Gempa bumi ini mengakibatkan puluhan orang meninggal. Beberapa orang luka-luka. Sejumlah bangunan roboh dan mengalami kerusakan. Selain itu, dilaporkan juga terjadi longsoran dan kerusakan berat pada permukiman dan bangunan lainnya di Kabupaten Bantul karena dekat dengan sumber gempa bumi.

Fig. 2. Text 1 paragraphs that students read.

In this phase, the subject also shows his skills in formulating important things as seen in Text 1 based on the results of silent reading such as detailing the date of the event and its relationship to other events in the text; detailing the impact of events on other events presented in the text. However, research subjects still have difficulty in organizing the core records of information from reading results. This is overcome by utilizing information schemes. Both Subject-1 and subject-2 have understood the outline of the text that is read. Subjects 1 and 2 begin to skillfully reveal the text content even with short sentences by connecting the mind maps they make.

C. Baseline-2

The Baseline-2 (A-2) phase is carried out three times until the data obtained is stable. This phase is carried out to see the impact ability after the intervention is given. The ability revealed is about the ability of the subject in reading comprehension includes the skills to determine the core information in the text, determine the main idea per paragraph, and connect each information (in the form of events, opinions, or facts) in the text. Based on the measurement results through a test of comprehension reading skills, obtained information on improving the ability to read comprehension of subject-1 and 2. Subjects 1 and 2 show their understanding of the content of the text by detailing and linking information in the text appropriately; shows the referent of the bookmark or pronoun in the text correctly; and correctly summarize the idea outline in the text.

D. Treatment-2

Phase Treatment-2 (B-2) was carried out for three times (three meetings). One meeting lasts for 90 minutes. This phase is an intervention as in the Treatment-1 phase that is by

applying the mind map method based on information schemes in reading comprehension learning in the research subject. In this phase, the ability of the subject to understand the text content is better than the ability in the initial phase. In this phase Subjects 1 and 2 show their skills in designing concept maps about the contents of the text and grouping and linking the core information records in each paragraph correctly. In this phase, the subject is able to explain the contents of the text correctly again. In fact, subject-1 and 2 are able to explain the relevance of the text title with the contents of the text that has been read.

V. CONCLUSION

Based on the results of the study, it can be concluded that reading comprehension learning with information schemes based on information schemes can improve the reading comprehension ability of research subjects. Improved reading comprehension skills are indicated by the skill of organizing ideas in text based on reading results, good reading habits, and the accuracy of determining the main ideas in the text. Research related to learning using mind map methods will be more effective if combined with proper treatment time planning and by involving a study of the research subject schemata.

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